RAILROAD GAZETTE

FRIDAY, OCTOBER 12, 1877.

Mine Locomotives for Gold Mines.

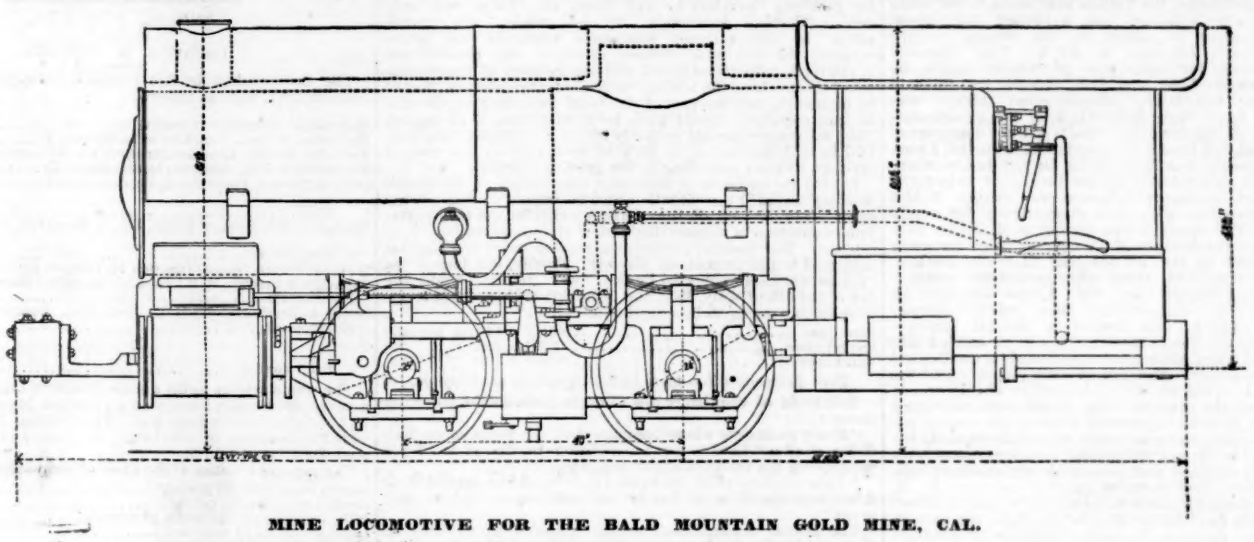
We present, in this issue, engravings and description of a mine locomotive, by the Baldwin Locomotive Works of Philadelphia, which is in use at the mines of the Bald Mountain Gold Mining Company, at Forest City, California. It is employed in a tunnel 4,000 feet in length, in which is a track of only 20 in. gauge, laid with T rails, and having grades some of which are as steep as 220 feet per mile. The tunnel is four feet wide at the track and for 18 inches up; thence it tapers to 2½ feet in width at the top. The extreme height from level of rails to top of tunnel is 5½ feet. The track has curves of from 60 to 150 feet radius. Small four-wheeled cars, having wheels 12 inches in diameter, and a wheel-base of 20 inches, and which weigh 750 pounds each, and can carry two tons each, are used on this track. The ventilation is obtained from air shafts and air-warp, without any blowers or furnaces, the current of air moving at the rate of about four miles per hour.

In the summer of 1876 Mr. H. W. Wallis, in behalf of the Bald Mountain Gold Mining Company, opened a correspondence with the Baldwin Locomotive Works, of Philadelphia, with reference to a mine locomotive for working this track. His requisition was for a locomotive to work by compressed air, if possible; some fear being entertained as to the practicability of working a coal-burning locomotive, on account of the effect of the gases on the ventilation. The Baldwin Locomotive Works, believing, from their experience in the construction of mine locomotives for underground work in the coal mines of Pennsylvania, that a locomotive burning anthracite coal would be unobjectionable in the tunnel of the Bald Mountain mine, in view of the ventilation as described above, recommended such a machine for the purpose. They undertook to construct a locomotive which could haul 30 or 40 empty cars up the maximum grade in the tunnel, which was then assumed to be only 166 ft. per mile. They estimated its consumption of fuel would be from 400 to 500 pounds of coal daily in hauling a total of 192 cars up the grade in eight hours.

The locomotive was ordered, constructed and shipped in October, 1876. It reached its destination and began service a short time after. The results of its work are fully and carefully stated in a letter from Mr. H. W. Wallis, of the Bald Mountain Mining Company, to Messrs. Burnham, Parry, Williams & Co., of Philadelphia, given below. The dimensions of the locomotive are mostly shown in the engraving.

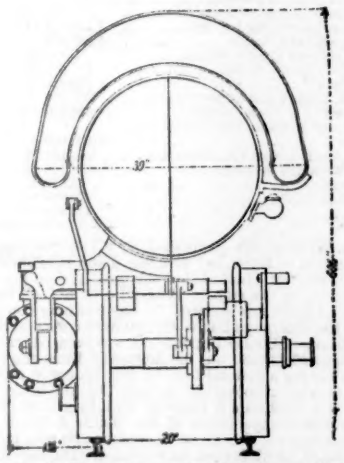
We add the following particulars of this engine:

Cylinders, 8 × 12 in.; diameter of driving wheels, 24 in.;
Wheel base, 3 ft. 4 in.; tank capacity, 110 gallons;
Weight in working order, 15,000 pounds;
Height, 61 in.; width across cylinders, 46½ in.;
Width across tank, 39 in.



MINE LOCOMOTIVE FOR THE BALD MOUNTAIN GOLD MINE, CAL.

Built by the Baldwin Locomotive Works, Philadelphia.



The following is the letter of Mr. Wallis, dated from the office of the Bald Mountain Mining Company, at Forest City, Cal., May 13, 1877:

"*Messrs. Burnham, Parry, Williams & Co.:*

"GENTLEMEN—Your note making inquiry regarding the working of the mine locomotive built by you for us last fall has remained for some length of time unanswered, for the reason that our haul was too short to give a fair statement of its capacity. I am now able to furnish a statement of its work, although it is capable of doing twice the work which we have for it.

"The locomotive has given entire satisfaction, working completely in every respect. In fact, it is what engineers call a remarkably smart one, running since we had it without any repairs excepting replacing the cylinder heads, which were too light. We find the tires too soft, causing them to wear rapidly.

"The estimates made by you were under its capacity and cost of operating. We can haul 45 of our cars, with 80 men and ten loads of timber and material, up our grade and into the mine, making the trip in five minutes, or at the rate of nine miles per hour. We can bring out 18 loaded cars with the locomotive alone, with the use of the brake which we put on here. We have no brakemen. We use anthracite coal and find no deleterious effects from steam or gas on our ventilation. Our air shaft is sunk 2,000 feet from the mouth of the tunnel and is in two compartments of 3½ feet square each. At the top we drop two inches of water into the centre of each compartment, which forces a strong current of air down the shaft and through the air ways, giving the air to the workmen first and carrying off the steam and what little gas is generated from the coal. We have already made a saving of more than the cost of the locomotive and attending expenses in the working of the mine.

"Following is a statement for the week of six days now closed, which is a fair comparison with all of the work:

Length of haul, 3,800 ft.	Grade, 166 to 220 ft. per mile.
Weight of cars, each, 750 lbs.	Diameter of wheels, 12 in.
Wheel base, 20 in.	Gauge of track, 20 in.
Cars each carry 2 tons.	

Car loads gravel taken out per week, 2,936 = 5,872 tons.

EXPENSE.

4,370 lbs. anthracite coal	$87 40
Engineer's wages	48 00
Head-lights, oil and tallow	4 10
Total	$139 50

Cost per car-load, 4¾ cents = 2⅜ cents per ton.
Distance run, not including switching, 200 miles.
Mule power costs 9 cents per car load.
Man " " 21 " " " "
* * * * * * * * *

Old Rails and the Effect of their Use on the Iron Trade.

While few iron manufacturers can be found who are willing to squarely acknowledge that they use old rails to any extent in the manufacture of bar iron or nails, there is no doubt that they are used largely in all parts of the country, and that their consumption is increasing. Many virtually confess to their use in the reduction they make in the price of their iron; others confess to the use of a greater or less percentage; while others, like the Western nail mill, to which we have often referred, boldly say they use them, and that they make a good iron and nail.

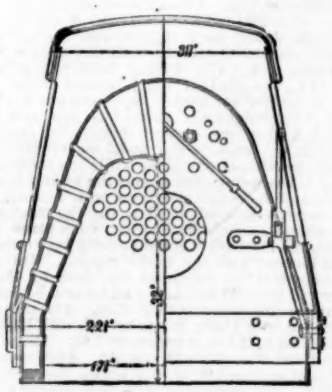
The use of these old rails is having a marked effect on the iron trade, and one that promises to continue for months and years. There are in the United States, in round numbers, 78,000 miles of railroad which require, say, 7,000,000 tons of rails. There have been made in this country and imported about 1,750,000 tons of steel rails, leaving, say, 5,250,000 tons of iron rails to come upon the market in some form. Some of these rails will be rerolled and put down again; others will be moved from the main track to sidings and see service for years to come; but all will sooner or later come into the market as scrap, and steel will take their place unless Bessemer advances sharply in price, of which there seems little hope.

There are, then, four to five million tons of scrap iron that will come into competion with the products of our blast furnaces during the next few years. Of the effect of such a competition as this upon the ore and pig iron trades there can be but little question. It is fair to estimate that the amount of rails consumed this year will be half a million tons, and as these are sold at from $19 to $21 in the era of low prices for bar iron and nails, it is no wonder that they are used largely in place of pig iron, which costs almost as much. This can but have a tendency to reduce the price of pig iron and keep it down.

The effect of the use of these rails on the price and quality of bar iron and nails is more marked and traceable than it is on pig iron. Ironmasters know that there is a great difference in the quality of rails. The rails made from the irons of Missouri are much better for rolling-mill purposes than those made in Eastern Pennsylvania, and most of our American rails are better than those imported, whose character Mr. Hewitt so graphically describes in his report as Commissioner to the Paris Exposition. We are inclined to believe that a good deal of the success of General Powell in the use of old rails at Belleville, Ill., is due to the character of the rail he uses rather than to his patent, as his process has been tried in other sections and has not made a better nail than the same rails piled in the usual way. It is also well known that there is a difference in the quality of the several parts of the rail, the head being cold-short and the other parts red-short or neutral.

But notwithstanding all this, by close and careful selection and care in working, some portion of old rails can be used in the manufacture of certain kinds of merchant iron. We have seen nails made with 25 per cent. of old rails that the most expert could not have distinguished from those made out of the best of iron; indeed the finish was superior. We have seen excellent sheet iron made with 75 per cent. of old rails, but for making a first-class iron we think the fewer old rails used the better. Iron that sells at from $1.60 to $1.75 should be all old rails. The iron will be as good as the price.

This leads us to speak of the effect of the use of these rails on the price of merchant iron. There is no doubt but that a large part of the very low-priced iron sold during the present year was made from old rails. Some manufacturers tried to meet these prices and furnish good iron, but they soon abandoned the attempt and began to inquire where old rail shears could be bought. That iron made from old rails is largely responsible for keeping the price down to its low figure is unquestionable, and it cannot fail to have its influence in this direction as long as such iron is made. Consumers, induced by the difference in price between it and iron made from first-class stock, will take the risks and buy it. It is useless to tell them what the result will be. With as little margin as there is in most goods, and the strong competition forcing prices down lower and lower, they will not listen. There seems to be no help for it but to work on in the best way possible until the rails are largely exhausted or there is such an increased demand for iron and advance in price as to justify the use of better material.—*Iron Age.*



Electro-Magnetism Applied to Railway Wheels.

Attempts have been made, during a considerable period, to utilize electro-magnetism in working railways; sometimes directly as motor force, sometimes for brakes, sometimes to increase adhesion. M. Dreyfus has made a collection of the records of the various attempts, in which he says that Amberger first employed electro-magnetism as motive force in 1851. In 1865, Bellet and De Rouvre showed to the Societe des Ingenieurs Civiles a model locomotive, meant specially for postal service, but they had also in view the application of their system to trains. In such cases it is a question of whether zinc or coal is dearer as fuel. Amberger also proposed, in 1851, the employment of electro-magnetism for brakes; flat electro-magnets should be made to act, at a given moment, on the rails. This would effect a great saving of wheel-tires, the friction and wearing being on the rails; but the method was never thoroughly tried. The first serious experiment with an electro-magnetic brake was made by M. Achard, who is still continuing his observations, and hopes to bring them to a successful issue. Adhesion of a locomotive's driving wheels would favor the action of friction (the mean co-efficient of friction 0.17, sometimes fully under 0.1); and the drawing power of the locomotive cannot, of course, exceed the friction of the wheels on the rails. An increase of the tractive force can be obtained by increasing the weight of the locomotive; but such an increase of dead weight is especially disadvantageous on inclines, and the more so that the weight of the locomotive must be calculated according to the greatest incline present on the line. It has often been attempted, therefore, to help the fric-

tion with electro-magnetism, but hitherto without any satisfactory success. A new arrangement for this purpose, by a Swiss engineer, M. Burgin, has lately been tried on the North-eastern Railway, in Switzerland. After a brief historic survey we shall describe it. The first idea of applying electro-magnetism in this way may have been given by a lecture experiment of Professor Eisenlohr, in Carlsruhe, who made a magnet of a horseshoe-formed locomotive axle, by winding round it 500 m. copper wire, of 4.5 mm. thickness, so that when the wire was traversed by a current from twenty Grove elements the magnet would bear 5,000 k. In 1846 Dr. Wright proposed to make the wheels of locomotives magnetic, and estimated that each wheel might thus acquire an attractive force of 1,000 k. on the rails; he also remarked that the force of attraction might be rendered variable. There is no record of the proposal having been carried out. When M. Nikles was consulted, in 1851, by MM. Amberger and Cassal, as to a physical means of increasing the pressure of locomotive wheels, he recommended electro-magnetism. In his first arrangement, a horseshoe electro-magnet was fixed to the body of the locomotive, between two pairs of wheels, its poles were about 4 mm. from the rails. A small model acted well on an incline; the motive force was derived from a weight connected with the axle by a cord passing over a pulley at the top of the incline, another weight was suspended from a cord passing to the locomotive over a pulley at the bottom. Soon after M. Nikles replaced this electro-magnet by coils enclosing the lower part of each wheel nearly to the rail, each coil 250m. of copper wire; they were attached to the frame of the locomotive. Good results were had thus with a small model on a changeable incline. Thereafter, similar experiments were made on a 20 per cent. incline, with a pair of locomotive wheels 1m10 m. diameter, and with sixteen battery elements; in dry weather the friction was about 350 k.; the adhesion through electro-magnetism 450 k. (or, supposing the coefficint of adhesion 0.1, 4,500 k.); in damp weather the friction went down to 100, while the electro-magnetic adhesion was weakened only about 50 k. A thick layer of tallow on the wheels brought down the magnetic adhesion to 400 k. The magnetic adhesion, therefore, for each pair of wheels might be estimated at about 1,000 k. The expenditure in acid and zinc during ten hours' uninterrupted service was about 11.2m. It was thought deducible from the experiments that the velocity of rotation of the wheels did not compromise the magetic action, but from experiments on the Paris & Lyons Railway the opposite was proved; for in the heavy train, which moved with slow velocity up an incline of 10 in 1,000, scarcely 9 per cent. increase in adhesion was gained. Nikles and Amberger, therefore, gave over magnetizing the wheels with such coils. The cause of non-success in M. Nikles' first arrangement lay in the distance of the magnet from its armature; in his second it lay in the fact that the position of the pole could not shift with sufficient rapidity. During the experiments on the Lyons Railway, M. Nikles thought of magnetizing the whole circumference of the wheel, and devised a special arrangement for this purpose, which, however, was never carried into practice. In 1865 a new arrangement was tried on the Central Railroad, in New Jersey. The copper coils, fixed round the tires, on the inside of the wheels, made the two wheels on one axle pole of a single magnet. The experiments, continued more than a year, gave an increase of about 40 per cent. in adhesion. These American experiments were discontinued, because at that time it was not understood how to produce, with a dynamo-electric machine, and comparatively small expenditure of mechanism, very powerful electric currents. In M. Burgin's system the entire axle with its wheels is also turned into a magnet with fixed poles. But he envelops the axle itself with the wire; and with increasing thickness of windings towards the wheels, in locomotives that have external cranks, but with uniform thickness in those with internal. In the case of coupled wheels, the winding is so arranged that there is an alternation of poles, the piece of rail between two wheels forming a closed armature. This mode of winding allows an increase of the number of turns, and consequently, stronger magnetization. A small locomotive model (but without engine and boiler), with three pairs of wheels and external cranks, was placed on a 30 per cent. inclined plane, and the coils were connected by long wires and a commutator with five Bunsen elements. The driving force was supplied by a weight of 12 k., the cord of which passed round the three axles. The wheels of the model (its weight was 8.5 k.) slipped in position, if the weight was allowed to run, and the circuit not closed; but when the current flowed, the model went up the incline. If the brake of the model was applied, the latter remained in position on the plane while the current was flowing; but on interrupting the circuit the wheels began to slip on the rails, and the model slid down with increasing speed; when the current was admitted again the model stopped, notwithstanding its acquired velocity. On a plane of 100 per cent. incline, the locomotive could be held fixed only when the current was flowing and the brake applied. On the under side of a horizontal line the model was held by magnetic attraction, moved too and fro, and could even be loaded with 7k.; the entire attraction was thus 15.5k. On the horizontal line, still loaded with 15.5k., it was moved, with brake applied, by a weight (suspended over pulley) of 7.5k. The coefficient of friction was thus: $F_1 = 7.5 : 24 = 0.312$. After removal of the 15.5k. load, and application of the brake, the model was first moved by 10k. The coefficient of friction was thus: $F_2 = 10 : 24 = 0.416$. The proportion of the two was $F_1 : F_2 = 313 : 416$, and, even with wet rails, it continued the same.—*English Mechanic.*

Tariffs for the Transportation of Passengers.

[From Jacqmin's "De l'Exploitation des Chemins de Fer," Tome I., chapter viii., page 303. Written in 1868.]

French Tariffs.—The tariffs which the French companies are authorized to charge for the transportation of persons as well as for the transportation of freight are composed, as we have said, of two distinct parts:

The rights of income;

The prices of transportation.

The prices of transportation include only the reimbursement of the expenditure made to bring about the transportation, not forgetting in this latter figure the cost of repairs and maintenance of the railroad.

This division of railroad tariffs enables us to show directly how erroneous are the comparisons made so frequently between the prices of railroad transportation and those of transportation by roads, rivers or canals. In one case, the price paid by the traveler or the freight has to cover the expense of construction, the cost of maintenance, and finally the cost of hauling; in the second case, on the contrary, the price of transportation corresponds to the cost of hauling alone, the State taking in its charge the expenses of constructing and maintaining roads, rivers and canals. The railroad companies could lower their prices from 50 to 60 per cent. if the State should reimburse them for the capital of first establishment and should devote 40 to 50,000,000 of francs each year to the maintenance and renewal of the railroads.

The prices fixed by Article 42 of the Cahier de Charges are as given in the following table:

The rate sheets of the first railroads constructed in France stipulated only 0.05 franc per kilometre for the transportation of third-class passengers, but the cars were not covered and the passengers were exposed to all inclemencies of the weather. These cars were suppressed in 1848, and, to compensate for the increase of expense which the substitution of cars with roofs and sides and windows for the old vehicles imposed on the companies, the price per kilometre was increased by half a centime.

We recall the conditions on which the tariff of 0.055 was substituted for the tariff of 0.05, because they show well that the tariffs are the remuneration for a service rendered; this is what

Passengers.	Prices.* For inter-est.	For trans-portation.	Total.
Covered coaches, furnished and closed with glass (1st class)	0f.067	0f.033	0f.10
Covered coaches, furnished and closed with glass, and with cushioned seats (2d class)	0.050	0.025	0.075
Covered and inclosed coaches with windows (3d class)	0.037	0.018	0.055

Children.

Under three years, children pay nothing, on condition of being carried on the knees of the persons who accompany them.

From 3 to 7 years, they pay half price and have rights to a separate place. Still in the same compartment, two children may occupy only the place of one passenger.

Over 7 years they pay full price.

is forgotten too completely by those persons who demand almost equality of treatment for the passengers of the three classes.

Tax of the dixieme.—The rates which we have just indicated do not include the increase of the tariff charged by the companies, paid over by them to the public treasury, and which is known under the name of tax of the *dixieme*. This tax having been established always on public vehicles, there was no motive for relieving travelers by rail from it. There was only one equitable distinction to be made: the tariffs asked by the railroad companies represent the remuneration for two quite distinct services: the construction of the road, properly so called, and the industry of transportation. On invoking the analogy with the transportation effected by highways, only the part of the tariff depending on the cost of transportation should have been subjected to an impost. This was comprehended perfectly by the legislature, and, from 1837 to 1855, the impost *du dixieme* bore only on the cost of carriage without extending to the interest charge.

In 1855 the necessity of increasing the receipts of the public treasury modified this situation, and the impost *du dixieme* was extended to the sum of the charges levied for the transportation of passengers without distinction of transportation or of interest. Merchandise carried at passenger speed was likewise subjected to the impost *du dixieme*. Finally, the impost *du dixieme* was itself increased by two "war" tenths. Under the law of the 5th of July, 1855, the legal kilometric charges applicable to passengers became the following:

First class.....0f.112 = 3.50 cts. per mile
Second class.....0.084 = 2.62 " " "
Third class.....0.0616 = 1.92 " " "

Free Transportation of a Certain Quantity of Baggage.

Article 44 of the Cahier des Charges contains the following clause:

"Every passenger whose baggage shall not weigh more than 60 lbs. shall not have to pay an addition to the price of his passage for the carriage of this baggage.

"This privilege shall not extend to the children carried free; it will be reduced to 40 lbs. for the children carried at half price."

The liberal arrangement which precedes exists only in France. In England and in almost all the other European States, baggage is charged separately and at a high rate.† The system followed in France constitutes a real reduction of the price of passage, and creates for the companies, with a very heavy burden, a responsibility which is not compensated by the levying of any charge.

Comparison of the French Legal Bases with the Legal Bases of Other Countries.

In Chapter V. we indicated the rates of the English railroads, and showed that these rates were higher than the French rates by about 50 per cent. There are no similar differences between the French legal bases and the legal bases fixed in the other countries of Europe, as the subjoined figures, all relating to the kilometre, demonstrate:

1. *Belgium.*

Before the 1st of May, 1866.

	1st class.	2d class.	3d class.
Express trains	0.10	0.075	....
Ordinary trains	0.08	0.06	0.04

There is no free baggage.

2. *Switzerland.*

All Trains.

1st class..... 0.1041 | 2d class..... 0.0729 | 3d class..... 0.0520

3. *Prussia.*

Prussia and Austria have four classes of passengers on several railroads; the fourth-class cars are a sort of covered platform, similar to the cars used in France for the transportation of goods and cattle; the passengers are stowed away in them standing. The introduction of this fourth-class into France has been asked for sometimes, but we think that the conditions in which the passengers are placed would not be accepted by the French population.

State Lines.

	1st class.	2d class.	3d class.	4th class.	Military.
East Prussia .....f.	.106	.081	.05	.0266	.022
Lower Silesian & Mark.....	.108	.080	.05	.025	.022
Upper Silesian.....	.103	.078	.0465	.0266	.02
Berg & Mark.....	.098	.078	.0560	.0320	.025
Rhenish.....	.121	.060	.04	.0180	.023
Cologne & Minden.....	.116	.075	.05	.0266	.0266

On several lines, the rates of first and second class are increased by 20 per cent. for express trains.

4. *Austria.*

	1st class.	2d class.	3d class.
Austrian roads...	0.12	0.09	0.06
South Austrian.....	.12	.09	.06
" " Express trains.....	.14	.11	.06

5. *Bavaria.*

	1st class.	2d class.	3d class.
State Railroads.....	0.091	0.06	0.038

6. *Wurtemberg.*

State Railroads.....	0.091	0.06	0.038

7. *Italy.*

Railroads of Lombardy.....	0.10	0.08 0.075 0.07	0.06 .057 .06
Southern roads.....	.10	.08	.06
Roman railroads.....	.10	.07	.05

For the railroads of Lombardy an addition of 20 per cent. is authorized for express trains.

In England the legal rates authorized by the charters granted are not the same on all the roads. We find in a report addressed to the House of Commons, April 1, 1862, that the bases adopted on the greater part of the roads are 3 pence, 2 pence and 1¼ pence per mile, for the three classes of passengers, which corresponds to 0.177, 0.118 and 0.088 franc in French money per passenger per kilometre. On some roads an addition of 1d. for the first class, and of ½d. for the second class, is authorized for passengers by express trains, which would give in France 0.23 and 0.147 franc per passenger per kilometre.

Finally, there exists in England a fourth class, comprising what are called "Parliamentary trains," which was established for those of limited means, but which is yet at the rate of one penny per mile (0.062 fr. per kilometre), that is, at the same rate as our third class in France, tax included.

These trains have received the name which we have quoted because they were introduced by an act of Parliament in charters subsequent to the primitive charters. The proprietors of these old charters deferred to the desire expressed by Parliament, and these relatively low rates are applied upon almost the whole English system.

Increase of Rates for Express Trains.—The fast trains known by the name of express trains were not anticipated at the time of the construction of the railroads. In order to give the public these exceptional speeds, the English, Belgian and German roads have increased the rates, and the public understands that in order to obtain special advantages it is necessary to pay a certain addition to the price. The French cahiers des charge have not granted this right of increasing rates, and the companies, in order to answer the demands for speed made on them, have had to establish trains on which the price paid is only that fixed originally in the cahiers des charge. This liberal arrangement, however, has not given satisfaction to the public, and, as we have said when speaking of speed, express trains containing cars of all classes are desired. We cannot repeat too often that fast speed and heavy loads are two things which mutually exclude each other, and never can be reconciled.

* These prices are about equivalent to 3½ cents per passenger per mile for first-class, 2¼ for second-class and 1¾ cents for third-class cars for adults.

† Not so now in Germany or England.—*Translator.*

ANNUAL REPORTS.

Louisville & Nashville.

The lines worked by this company during the year ending June 30, 1877, were as follows:

	Miles.
Main Stem, Louisville to Nashville	185.00
Bardstown Branch, Junction to Bardstown, Ky	17.30
Knoxville Branch, Lebanon Junction, Ky., to Livingston	110.30
Richmond Branch, Junction to Richmond, Ky	33.40
Cecilian Branch, Louisville to Cecilian Junction	45.54
Total	391.54
Memphis Line, Bowling Green, Ky., to Memphis, Tenn	259.10
Total owned	650.64
Glasgow Branch, leased, Junction to Glasgow, Ky	10.50
Nashville & Decatur R. R., leased, Nashville, Tenn., to Decatur, Ala	122.30
South & North Alabama R. R., controlled, Decatur to Montgomery	183.00
	315.80
Total worked	966.44

The whole system forms a main line from Louisville to Montgomery, 490.3 miles long, with a principal branch to Memphis, and the other minor branches. The Cecilian Branch has been added to the lines owned during the year, and has been operated since Jan. 19, 1877.

The general account at the close of the year was as follows:

Capital stock ($13.838 per mile)		$9,003,418 82
Bonded debt ($25,335 per mile)		16,484,230 00
Bills, accounts and balances payable		2,176,673 62
Interest due July 1 and Aug. 1		172,310 20
Dividend No. 22, due Aug. 10		135,054 00
Profit and loss account		3,084,680 05
Total ($47,717 per mile)		$31,056,366 69
Cost of road ($36,776 per mile)	$23,927,979 04	
Due from Transportation Department	246,368 30	
Ten-year mortgage gold bonds	1,154,015 61	
Railroad stocks and bonds	1,667,702 48	
Pullman Southern Car Co. stock	84,000 00	
Louisville Bridge Co. stock	181,400 00	
Balances due	220,480 77	
Real estate, timber and quarry lands	987,554 01	
Alabama State 5 per cent. bonds	330,000 00	
South & North Alabama second-mortgage bonds	1,000,000 00	
Due from South & North Alabama Co	246,189 51	
Due from Nashville & Decatur Co	337,788 23	
Cecilian Branch	76,622 21	
Shop and fuel stock	470,786 64	
Cash	125,479 89	
		$31,056,366 69

The bonded debt was decreased by $71,480 during the year; it now consists of $3,746,230 bearing 6 and $12,738,000 bearing 7 per cent. interest. Included in the bonded debt are $1,408,000 bonds issued by the city of Louisville in aid of the road, of which $850,000 are not secured by any mortgage on the property. Of the mortgage bonds $80,000 have a special lien on the office building in Louisville; $646,000 are secured on the Knoxville Branch; $5,838,230 on the Memphis Line, the remaining $9,070,000 having a general lien on the property owned. The company is also responsible by lease for the interest on the bonds of the Nashville & Decatur and by guarantee for that on the first-mortgage bonds of the South & North Alabama. The annual interest charge on the company's own bonded debt is $1,116,433.80, or $1,793 per mile owned. During the year 21 Nashville & Decatur first-mortgage bonds and 65 South & North Alabama sterling bonds were bought for the respective sinking funds.

The earnings and expenses of the various lines for the year were as follows:

	1876-77	1875-76.	Inc. or Dec.	P. c.
Earnings:				
Main Stem and Branches	$2,700,499 46	$2,498,505 42	Inc. $201,994 04	8.1
Memphis Line	1,159,457 58	1,139,424 33	Inc. 20,033 25	1.8
Glasgow Branch	17,096 14	16,456 83	Inc. 639 31	3.9
Nashville & Decatur R. R.	679,591 61	631,780 68	Inc. 47,810 93	7.6
South & North Alabama R. R.	758,682 01	675,323 03	Inc. 83,358 98	12.3
Total, all lines	$5,315,326 80	$4,961,490 29	Inc. $353,836 51	7.1
Expenses:				
Main Stem and branches	1,374,810 00	1,386,710 89	Dec. 11,900 89	0.9
Memphis Line	809,306 58	793,400 70	Inc. 15,905 88	2.0
Glasgow Branch	13,117 89	12,250 94	Inc. 866 95	7.0
Nashville & Decatur R. R.	416,746 24	382,074 82	Inc. 34,671 42	9.1
South & North Alabama R. R	560,825 81	419,092 89	Inc. 141,732 92	33.8
Total, all lines	$3,174,806 52	$2,993,530 24	Inc. $181,276 28	6.1
Net earnings:				
Main Stem and branches	1,325,689 46	1,111,794 53	Inc. 213,894 93	19.2
Memphis Line	350,151 00	346,023 63	Inc. 4,127 37	1.2
Glasgow Branch	3,978 25	4,205 89	Dec. 227 64	5.4
Nashville & Decatur R. R.	262,845 37	249,705 86	Inc. 13,139 51	5.3
South & North Alabama R. R.	197,856 20	256,230 14	Dec. 58,373 94	22.8
Total, all lines	$2,140,520 28	$1,967,960 05	Inc $172,560 23	8.8

There was a gain in gross earnings on every line, and on net earnings in all except the Glasgow Branch and the South

& North Alabama, the loss on the latter being for reasons noted elsewhere. Some averages for the year were as follows:

	1876-77			1875-76		
	Earn. per mile.	Net earn. per mile.	Per cent. of exps.	Earn. per mile.	Net earn. per mile.	Per cent. of ex.
Main Stem and branches	$7,337	$3,692	50.99	$7,219	$3,212	55.50
Memphis Line	4,475	1,351	69.80	4,403	1,337	69.63
Glasgow Branch	1,628	379	76.71	1,567	400	74.44
Nashville&Decatur R.R.	5,557	2,149	61.32	5,166	2,042	60.48
South & North Ala. R.R.	4,146	1,081	73.92	3,690	1,400	62.06
Whole line	$5,648	$2,274	59.72	$5,388	$2,137	60.34

The net result of the Nashville & Decatur lease for the year was as follows:

Net earnings of road		$262,845 37
Interest on bonded debt	$150,184 12	
Hire of engines and cars	37,000 87	
Dividends on stock	98,553 44	
		285,738 43
Deficit for the year		$22,893 06

The amount charged to the construction account of the road during the past year was $3,036.20; during former years, $258,123, making a total of $261,159.20, which is to be reimbursed at the end of the lease.

The result of the operations of the South & North Alabama was as follows:

Net earnings		$197,856 20
Interest on bonded debt	$364,997 65	
Hire of engines and cars	73,158 93	
		438,156 58
Deficit for the year		$240,300 38
Amount advanced on construction account		23,093 43
Purchase of 65 sterling bonds		62,288 36
Advances and interest on old account		110,766 99
Total amount advanced during the year		$436,449 16

The net result of the Louisville & Nashville proper (Main Stem and branches and Memphis Line) was:

Net earnings		$1,675,840 46
Interest on bonded and floating debt		1,025,903 28
Surplus earnings		$649,937 18

Showing an increase of surplus earnings of $309,416.78, or 90.9 per cent., over the previous year.

President Standiford's report says:

"The financial depression following the panic of 1873, contrary to expectation, continued during the past year, and railroads, in common with all business enterprises, have suffered more or less during the latter-mentioned period.

"To this was added the political complications attending the presidential campaign, which, with the doubtful result, absorbed public attention for several months, and greatly disturbed all commercial intercourse.

"We also experienced local difficulties of a peculiar nature. In the months of December and January our connections north of the Ohio were unable, on account of heavy snowfalls, to transport our north-bound freights; consequently the business was forced via the Atlantic sea-board cities, and according to a careful estimate we lost from this cause alone $100,000 in gross receipts.

"On our Memphis Line we unfortunately, in the last month of the fiscal year, had a freshet unprecedented in the annals of the company, which partially destroyed nearly two miles of our road-bed, delayed our business very seriously, and entailed upon us a heavy loss.

"A statement of the results obtained in the past two years under the present management, compared with the two embracing that of the panic and the one before, may not prove uninteresting to the stockholders. The gross earnings for the years 1872-3 and 1873-4 were $11,616,747.29, and for 1875-6 and 1876-7, under the present management, were $10,276,-817.09; the net earnings for 1872-3 and 1873-4 were $3,049,-429.71, and for 1875-6 and 1876-7 were $4,108,480.33.

"In other words, in the last two years, with $1,339,930.20 less gross earnings than in 1872-3 and 1873-4, we realized $1,-059,050.62 more net in 1875-6 and 1876-7 than in the former time mentioned, a result worthy of the careful consideration of the stockholders. This is not due to any increase in rates of freight, as is shown by the following facts: The number of tons carried one mile in the year before the panic was 177,466,-795; in the year of the panic, 166,482,542; in 1875-6, 173,064,314; and in 1876-7, 202,114,027, showing that we have had an increase in tonnage in the past two years as compared with the former two mentioned. In obtaining these results your directory has not allowed the physical condition of the road to deteriorate, but placed it in better condition than ever before.

"This fact is fully demonstrated by the following statement, which compares the amount of rail and cross-ties laid in the road during the past two years with those of the two previous: In 1873-4 and 1874-5 there were laid in the road 3,413 tons of steel, 6,362 tons of iron, and 712,611 ties; and in the last two years, under the present management, there have been laid 3,900 tons of steel, 8,604 tons of iron, and 792,089 ties, showing an increase in favor of the last two years of 487 tons steel, 2,242 tons iron, and 79,478 ties. In other words, during the past two years we relaid nearly thirty more miles of track than in 1873-4 and 1874-5.

"The foregoing clearly shows that with less gross receipts, lower rates, and with a marked improvement in the physical condition of the road, we have been able to secure greater net results than in any of the previous years. This could not have been done unless we had exacted the closest economy and the most careful management in every department of the service of the company.

"After much trouble we have finally succeeded in making an equitable settlement with the State of Alabama. In lieu of an obligation which we held of that State, and on which she declined to pay either principal or interest, we have succeeded in obtaining $330,000 in 5 per cent. bonds, on which the interest has been and will be promptly paid, thus increasing our revenue and adding valuable assets to our resources.

"The South & North Alabama Railroad Company has delivered to us $1,000,000 in second-mortgage bonds of that company, bearing 7 per cent. interest, for advances made by us under the original contract for the construction of that road. As the resources of the South & North Alabama Railroad are developed, these bonds will prove valuable assets to our company.

"At the end of the fiscal year it was found that, after providing for the interest on our bonded and floating debt, paying the interest on the bonds and a 6 per cent. dividend on the stock of the Nashville & Decatur road, and the guarantee interest on the mortgage bonds of the South & North Alabama road, we had a large surplus, and your directory unanimously decided to declare a small dividend to the stockholders and apply the remainder to the reduction of the bonded and floating debt.

"The Main Stem of your road, extending from Louisville to Nashville, is now virtually laid with steel rail, and the annual expense of making renewals reduced to a minimum. We have also placed steel rail on the heavy grades of our other roads.

"The Memphis Line is in excellent condition, and will need no large outlay during the current fiscal year. Memphis, the terminal point of this road, together with Western Tennessee, is rapidly improving. Should that city and our line again receive the benefit of the Texas trade, now arbitrarily forced via St. Louis, the revenue to us from this portion of our system will be largely increased.

"The Knoxville, Richmond, Bardstown and Glasgow branches are all in excellent condition, and form good feeders to our main stem.

"The Nashville & Decatur road is rapidly growing in value to us. Burdened by a contract made in 1871, which compels us to pay an exorbitant rate of interest upon the actual value of its stock, we are placed at great disadvantage, but we have succeeded in making this part of our system in itself almost self-sustaining. It penetrates a rich agricultural country, and, connecting the South & North Alabama road with the Main Stem, the amount of traffic passing over it to the other parts of our system is very large, and, consequently, the control of this road is of much importance to us.

"On the South & North Alabama road we have been placed at considerable unforeseen expense. When it was constructed it seems that a large quantity of poor iron and cross-ties was placed in the track, a great portion of which has been replaced this year at a heavy expense. The amount expended from this cause alone was not less than $60,000 during the past year. In addition, under a contract with the city authorities of Montgomery, Ala., made in 1872, we were compelled to build a union depot at that place. This greatly facilitates our business there, and, with the rents that we receive from connecting lines which use the building, it is a paying investment.

"During the past year the company has acquired, by purchase, the Cecilian Branch of what formerly was called the Louisville, Paducah & Southwestern Railroad. The acquisition is about 46 miles in length, and possesses a value from its position as a parallel road with our Main Stem from Louisville for the distance mentioned. Forming part of a through line, it was, in conjunction with its connections, a constant disturber of rates to nearly every portion of the South and Southwest, and the injury it was capable of inflicting has been several times very apparent.

"A favorable opportunity for its purchase occurring, your directory lost no time in commencing and concluding negotiations, and it was turned over to us Jan. 19, 1877. By this purchase we naturally secure the main line of the former Louisville, Paducah & Southwestern Railroad as a feeder. This road is 186 miles long, extends from Paducah to Elizabethtown, and brings to our Main Stem a large amount of business. Our relations with the management of that road are of the most harmonious character, and our joint efforts are directed to developing its line so as to yield us the greatest amount of revenue possible.

"In itself the Cecilian Branch will be of great value to us. The crowded condition of the northern part of our Main Stem, with the necessary high rate of speed of our passenger trains, would have soon made a double track to Elizabethtown necessary, and this the purchase virtually gives us. The grades of the Cecilian Branch are much lighter than those of our trunk line north of Elizabethtown. It is in very good condition, and capable of accommodating a heavy traffic at a minimum cost.

"The rapid growth of Louisville will soon compel its people to seek suburban homes, and the line of the Cecilian Branch, passing, as it does, through a rich and fertile country to Salt River, and beyond to a high and healthy elevation with beautiful scenery, as it meanders along the Ohio, cannot fail to afford the very best inducement to parties seeking health, pleasure and desirable residences to locate thereon. In short, the acquisition can, with proper management, be made very profitable in itself and to our system.

"During the year an important feeder to the Nashville & Decatur Railroad has been built. This road extends from Columbia, Tenn., to Lewisburg, a distance of 20 miles, and, penetrating a rich agricultural country, its present and prospective value to our system is considerable. * * *

"On the South & North Alabama road several new coal mines have been opened, and a new blast-furnace, with a capacity of 40 tons per day, has been built at Oxmoor, and is now in operation. This, in connection with the other furnace at that place, built in 1876, will yield a yearly revenue of approximately $125,000, and, in addition, locate a large amount of capital and labor upon the line of our road, from which we will derive further advantages."

The report refers at some length to the many advantages offered for the establishment of manufacturing industries on the line of the road, and instances several cases where flourishing towns have been built up. The company owns about 500,000 acres of land in Alabama, about one-quarter being mineral lands. The mineral lands are being sold for from $10 to $25 per acre, the other lands at $1.50 to $5.

The new office building in Louisville, lately completed, was necessary for the service of the road. The concentration of the offices in one building is not only convenient, but has made a reduction in working force possible; some revenue is also derived from the rent of a part of the building not now used by the company.

Chicago, Danville & Vincennes.

Gen. Adna Anderson, Receiver of this road, has presented to the United States Circuit Court a report of the operations of the road for the year 1876, with a general statement covering the whole period of his receivership. The road worked for the year 1876 was as follows:

	Miles.
Main Line, Dolton, Ill., to Danville	108.0
Indiana Branch, Bismarck to Coal Creek, Ind.	24.0
Total owned	132.0
Chicago & Southern R. R., leased, Junction to Chicago	20.5
Pitts., Cin. & St. Louis track leased in Chicago	6.0
Total worked	158.5

The road is now known as the Chicago & Eastern Illinois, the bondholders, who bought the property at the foreclosure sale, having organized under that name.

The work done for the year was as follows:

	1876.	1875.	Inc. or Dec.	P. c.
Train mileage, freight	368,381	330,554	Inc.. 37,827	11.4
" " passenger	200,434	179,976	Inc.. 20,458	11.4
" " service	31,030	33,760	Dec.. 2,730	8.1
" " switching	174,669	169,875	Inc.. 4,794	2.8
Total	774,514	714,165	Inc.. 60,349	8.4

	1876.	1875.	Inc. or Dec.	P. c.
Passengers carried	122,236	95,742	Inc.. 26,494	27.7
Passenger mileage	3,749,454	3,489,100	Inc.. 260,354	7.4
Tons coal carried	322,943	196,399	Inc.. 36,544	18.6
Tons other freight	252,762	160,656	Inc.. 92,106	57.3
Tonnage mileage, all fr't	53,217,695	40,373,607	Inc..12,844,088	31.8
Av. pass. train load, No.	19.0	19.0	....	...
Av. freight train load, tons	144.4	115.0	Inc.. 29.4	25.6
Mileage of pass. train cars	590,926	532,888	Inc.. 58,038	10.9
Mileage of freight cars	7,646,550	5,841,227	Inc.. 1,805,323	30.9
Earn. per pass. train mile.	$0.722	$0.764	Dec.. $0.042	5.5
Net per pass. train mile	0.236	0.240	Dec.. 0.004	1.7
Earn. per freight train mile	1.927	1.446	Inc.. 0.481	33.3
Net per freight train mile.	0.623	0.455	Inc.. 0.168	37.0
Earn. per pass. per mile	3.26 cts.	3.33 cts.	Dec.. 0.07 ct.	2.1
Net per pass. per mile	0.67 "	0.63 "	Inc.. 0.04 "	6.3
Earn. per ton per mile	1.33 "	1.49 "	Dec.. 0.16 "	10.7
Net per ton per mile	0.43 "	0.47 "	Dec.. 0.04 "	8.5

In addition to the tons carried above reported 14,998 tons of freight were transported for the use of the road. The average tonnage per loaded car was 10.1 tons; 37 per cent. of the freight car mileage was of empty cars. Of the coal carried 140,373 tons were from the Indiana Division. The cost of locomotive service was 17.11 cents per mile run.

The earnings for the year were as follows:

	1876.	1875.	Inc. or Dec.	P. c.
Freight	$448,035 49	$331,341 54	Inc..$116,693 95	35.2
Coal	261,755 75	270,200 77	Dec.. 8,445 02	3.1
Passengers	122,497 73	116,302 14	Inc.. 6,194 59	5.3
Express, mail, etc.	39,877 33	39,020 65	Inc.. 856 68	2.6
Total	$872,166 30	$756,865 10	Inc..$115,301 20	15.2
Expenses	571,363 37	506,077 92	Inc.. 65,285 45	12.9
Net earnings	$300,802 93	$250,787 18	Inc.. $50,015 75	19.9
Gross earn per mile	5,502 62	4,775 17	Inc.. 727 45	15.2
Net earn. per mile.	1,897 81	1,582 25	Inc.. 315 56	19.9
Per cent. of expenses	65.51	66.86	Dec.. 1.35	2.0

There were paid from net earnings the following amounts:

Insurance and taxes	$18,201 44
Rental Pitts., Cin. & St. Louis track	29,310 00
" Chicago & Southern R. R.	24,922 52
" Chicago station grounds	6,201 50
Rent of freight cars	30,088 78
Purchase of freight cars	37,561 52
Permanent improvements of road	34,692 74
New construction ordered by Court	7,114 28
Total	$188,092 78

The expenses of the road were increased by its lack of equipment and its unfavorable position in Chicago, the payments for car mileage being $23,223.93 in excess of receipts, while the cost of switching and trackage in Chicago was $44,138.45. The road, like others, has suffered from a gradual decrease in freight rates, as shown by the following table:

	1876.	1875.	1874.	1873.
Gross earnings	$872,166 30	$756,865 10	$745,063 93	$734,252 90
Tonnage mileage	53,217,695	40,373,607	34,036,692	30,636,762
Rate per ton per mile	1.33 cts.	1.49 cts.	1.73 cts.	1.94 cts.

Very few if any Illinois roads have so low average rates.

During the year 384 tons re-rolled iron, 1,400 tons new steel rails and 85,539 new ties were laid on the Main Line; 2,231 new ties on the Indiana Branch.

A condensed statement of operations from June 1, 1875, the date of Gen. Anderson's appointment, to April 17, 1877, when he delivered the road to the purchasers, being one year, ten months and 17 days, is as follows:

Freight receipts		$1,351,704 24
Passenger receipts		197,905 84
Mail, express, car service, rents, etc.		108,242 11
Traffic balances, other railroads		96,079 49
Total		$1,753,931 68
Services	$652,463 00	
Supplies	370,363 78	
Traffic balances, other roads	78,679 85	
Car service, track service, rentals of equipment	128,410 15	
Rentals of tracks and grounds	117,484 51	
Insurance and taxes	11,911 81	
Miscellaneous	142,671 59	
		1,501,984 69
Balance		$251,946 99

A condensed general summary of all accounts carried up to Aug 31, 1877, the time of the Receiver's final accounting, is as follows:

Cash turned over by previous Receivers		$ 7,051 71
Supplies " " " "		16,806 39
Cash collected on account of previous Receivers		34,450 81
Cash collected on account of C., D. & V. R. R. Co		1,721 98
Supplies received from C., D. & V. R. R. Co.		2,804 41
Cash received from operating the road		1,753,931 68
Cash received from Clerk of Court		38,102 95
Total		$ 1,854,869 93
Cash paid on account of previous Receivers	$ 68,757 47	
Cash paid on account of C., D. & V. R. R. Co.	216,595 65	
Cash paid on account of operations of road	1,501,984 69	
Cash paid for new construction and improvements	35,600 74	
Cash paid by sundry orders of Court	10,316 72	
Supplies, etc., turned over to purchasers of road	42,282 50	
Cash on hand	2,003 86	
		1,877,541 63
Excess of credits		$22,671 70

This excess is represented by the excess of supplies and materials turned over to purchasers over those received with the road. A few small accounts remain to be settled, of which a special report will be made.

The Minor Minnesota Railroads in 1875-76.

Name of Road.	Property. Miles of road	Locomotives	Passenger train cars	Freight and other cars	Liabilities. Stock	Funded debt	Other debt	Traffic. Train mileage	Passengers carried	Passenger mileage	Tons freight carried	Earnings. Earnings	Expenses	Net earnings	Earnings per mile	Per cent. of expenses
					$	$	$					$	$	$	$	
Central, of Minnesota	40	1	1	16	587,300	600,000	28,400	24,960	6,900	177,242	21,963	46,030	41,753	4,277	1,151	90.8
Chicago, Dubuque & Minnesota	133	10	7	353	2,250,600	4,425,000	.....	171,520	59,525	2,959,573	95,975	264,607	216,611	63,996	1,990	79.6
Lake Superior & Mississippi*	169	11	14	405	5,125,000	7,692,000	147,829	597,414	59,766	3,249,817	235,898	566,479	564,419	2,060	3,352	99.6
Minneapolis & St. Louis†	42	4	5	76	94,820	700,000	41,998	52,332	40,710	656,167	145,615	141,361	108,934	32,427	3,366	77.0
St. Paul & Pacific, Main Line	207	19	21	329	5,000,000	10,607,250	80,139	329,169	230,540	2,982,514	186,194	624,023	403,699	220,324	3,019	64.7
St. Paul & Pacific, Branch Line‡	111	7	10	54	1,458,600	3,708,500	269,813	172,242	191,993	3,457,028	84,527	382,022	238,056	143,966	3,442	62.0
St. Paul, Stillwater & Taylor's Falls	24	..	..	..	289,900	518,500	78,230	.....	.....	.....	.....	79,879	40,038	39,841	3,328	50.1

* Includes Stillwater & St. Paul R. R., 13 miles. † Includes Minneapolis & Duluth R. R., 15 miles, leased.
‡ Includes St. Vincent Extension from East St. Cloud to Melrose, 35 miles, leased.

The reports are those made to the Railroad Commissioner of Minnesota for the year ending June 30, 1876, and include only those lines not otherwise reported. Since the close of the year the Lake Superior & Mississippi has been sold under foreclosure and reorganized as the St. Paul & Duluth. The Chicago, Dubuque & Minnesota is chiefly an Iowa road and is now being reorganized

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Editorial Announcements.

Passes.—*All persons connected with this paper are forbidden to ask for passes under any circumstances, and we will be thankful to have any act of the kind reported to this office.*

Addresses.—*Business letters should be addressed and drafts made payable to* THE RAILROAD GAZETTE. *Communications for the attention of the Editors should be addressed* EDITOR RAILROAD GAZETTE.

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies, the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

THE INSPECTION OF BRIDGES.

I.

The Ashtabula bridge accident of last winter had the effect of attracting the attention of railroad men all over the country to the security of the bridges on their own lines. The result was that such structures were more carefully inspected than ever before. This was due, not to the fact that such inspection was more necessary then than at any other time, but to this, that the results of defective construction of bridges were at that time brought sovividly and so terribly to the attention of the whole community. Careful inspection of bridges is just as necessary now as then, and safety on railroads is like liberty in a nation, in that the price of each is eternal vigilance. We therefore propose giving some hints, somewhat after the manner of agricultural journals, of work which should be done during the remaining few weeks of pleasant weather, before winter will make work of this kind, which is often of a very delicate character, both difficult and uncomfortable.

FLOORS.

One great cause of accident on bridges is the want of security of the floor in case trains get off the track on the bridge. To guard against this it is important that the cross-ties should be placed so close together that the wheels of the engine or cars will run over them without difficulty. To do this the spaces between the ties should not be more than 10 in. wide, and 6 or 8 in. is still better; and the ties should be strong enough to support the engine wheels in case they got off the rails. Ties 6 in. thick by 8 in. wide are a good size. In some cases heavy planks are laid on the ties, but this is open to the objection that snow is liable to accumulate on such a floor, especially if guard timbers are placed near the rails.

GUARD TIMBERS.

After the floor is made, so that the wheels of engines and cars will run over it without, difficulty some sort of guard should be placed on it, so that in case one or more pairs of wheels get off the rails, neither the engine nor cars can run far enough away from them to come in contact with the trusses in a "through" bridge or run off the floor on a deck bridge. The most effective arrangement for this purpose is a guard timber bolted to the cross-ties on the outside of each of the rails, made as high and placed as near to the latter as the rolling stock will permit. These timbers can ordinarily be made 8 in. high and 8 or 10 in. wide and be placed 15 in. from their inner edge to the inner edge of the rails.

It should be kept in mind that the chief object of guard timbers is to prevent the rolling stock from coming in contact with the trusses, and that unless they do this they are useless. The reason for placing them outside of the rails instead of inside is, that if they are inside they cannot be made so high, on account of the ash-pans, engine-truck bolts, cow-catchers and other parts of the rolling stock. When the timbers are placed on the outside of the rails the parts which are most liable to come in contact with them are the pilots or cow-catchers and the bolts in the tender frames. Careful attention should also be given to the construction of snow-plows, to see that they will clear the guard timbers.

In case any of the wheels should get off the rails, or if any portion of the cars or engine, such as a brake-beam, pilot or axle, should be broken or become detached so as to come in contact with the cross-ties, unless the latter are secured in some way they may be pushed up against each other so that the trucks may fall through the floor. For this reason the ties should be held apart either by blocks or distance pieces placed between them, or by notching the guard timbers into them. Whether the latter is done or not, the guard timbers should be securely bolted to the cross ties by $\frac{7}{8}$ or 1 in. bolts. It is best to sink the heads of these bolts into the wood on top of the timbers, so as to be flush, in order that any part of the rolling stock may slide unobstructed on top of the timbers in case of accident. Some of the cross-ties should also be bolted to the longitudinal stringers underneath them. The guard timbers ought to be spliced together where they join each other by halving each one on to the other, and to be effective must be continuous over all piers and abutments. One of the most serious accidents that can occur may be caused by a car or engine getting off the rails on the approach to a bridge and when it reaches the latter coming in contact with the end-posts. The bridge is liable to be entirely destroyed or "knocked down" in such cases. To guard against such occurrences the guard timbers should be carried out beyond the abutments and then splayed or flared out from the rails so as to lead the derailed wheels toward the centre of the track. When a pair of wheels gets off the track, it is evident that the wheel which gets off the inside of the rail may run toward the opposite side until it comes in contact with the opposite rail, or, in other words, a pair of wheels may run to one side of the rails a distance equal to the gauge. For this reason it is well, when there is room on the approaches, to carry the guard timbers out from each of the rails a distance equal to the gauge. In doing this, care should be taken so that their inclination may not be so great as to make the wheels liable to "climb over" or "mount" the timbers; but they should guide the wheels towards the centre of the track. In some cases the inner edges of the timbers have been inclined or chamfered. This is believed to be a mistake, because the wheels are then more liable to climb over the timbers than if the sides were perpendicular, and the very object of the timbers is to prevent the wheels from doing this.

GUARD RAILS.

In many cases guard rails are placed on the inside of the main rails. Although these add an additional safeguard, yet they are not believed to be so effective as guard timbers, because they are not so high, and therefore the wheels will climb or run over them easier than they will over a higher timber. It must be remembered that for the purpose of a guard there is no question involved of the durability or resistance to wear of the two materials, as neither is subjected to wear. It is therefore simply which presents the greatest obstacle to prevent the wheels from running away from the rails. As stated, the guard rails give additional security, and considering how imminent the danger is on bridges, no safeguard should be neglected which can give additional security. When they are used, they should also be extended beyond the abutments on the approaches to the bridge, and should be carried together in the centre between the rails in the form of a $<$, so as to guide the wheels which are derailed towards the main rails. The guard rails should be as near to the main rails as they can be placed with room for driving spikes between them.

TRACK.

The track on bridges ought to be in the most perfect condition possible. When the rails or joints become worn they should be removed and relaid elsewhere or nowhere. It often happens that through carelessness on the part of track-masters and others the track on the approaches is either higher or lower than that on the bridge itself, so that a train in coming upon the bridge either falls down, as it were, or strikes an elevation on the bridge. In either case the structure is subjected to unnecessary strains, which may be avoided by keeping the track on the bridge and on the approaches of the same level.

THE FLOOR SYSTEM.

By the floor system is meant the framing which supports the floor and transmits the load from the track to the trusses. The weakness of this part of bridges is one of the most common sources of danger, especially in those structures which were built ten or fifteen years ago. Since then the weight of rolling stock, especially of locomotives, has been increased so much that many of the bridges referred to are entirely too weak to carry with safety the loads to which they are subjected. Many of the earlier bridges were proportioned to carry loads of one ton per running foot of single track. This answered very well so long as the weight of engines did not exceed from 25 to 28 tons with 8,000 to 9,000 lbs. on each driving-wheel, and the greatest load on single panels 12 ft. long did not exceed 3,000 lbs. per foot. Even in such cases, however, the loads which the floor system was compelled to carry were one-half greater at times than it was calculated to bear. With the present heavy ten-wheeled mogul and consolidation patterns of engines, each panel is loaded successively with loads of from 4,000 to 6,000 lbs. per running foot, or from two to three times as much as it was calculated to bear. It is not surprising, then, that failures in the floor systems occur. In inspecting bridges, therefore, the person who is charged with the work should first learn the weight on the driving-wheels of the heaviest engines used on the road. This divided by the driving-wheel base or distance from the centre of the foremost to the centre of the hindmost pair of driving-wheels, if this distance exceeds the panel lengths, or by the panel lengths, if the wheel-base is less, will give the load per running foot which the panel system must carry. The loads which are imposed on the panel system of bridges are very fully elucidated in an article by Mr. Alfred P. Boller, published in the *Railroad Gazette* of Jan. 28, 1876.

FLOOR BEAMS.

After it is known what the actual loads are which the panels must carry, the inspector should ascertain whether the cross floor-beams are strong enough to carry such loads safely. It would lead us too far to explain how to calculate the strength of the different kinds of floor-beams used, but if the inspector does not know, or *is not sure that he knows*, he should measure them and send the dimensions to a competent bridge engineer to calculate them for him. When these beams are made of wrought-iron plates, with angle or other forms of iron riveted to them, the size and location of the rivets should be carefully noted, as they have an important duty to fulfill in maintaining the strength of the beam.

FLOOR BEAM ATTACHMENTS.

It should *always* be kept in mind that it is entirely useless to make the floor beams or any other part of a bridge strong if the attachments are not equally as strong or stronger. All that is said about the weakness of the floor system of old bridges applies with equal or greater force to their hangers and other fastenings. These should be carefully calculated, and it is always best to give an excess of strength to these over the beams themselves. The nuts which support floor-beams should have no chance to work loose or turn on the bolts. On the Erie Railway the side of the nut next the inside of the bridge is painted white, so that the inspector as he passes along can see at a glance whether it has turned on the bolt. This is a good practice, and should be imitated. When floor-beams are made of riveted work the rivets should be examined to see whether any have worked loose, and if any of the joints have separated, which is usually indicated on the paint, the reason for it should be sought. All brackets, etc., riveted to the main trusses should be examined, and the cause for any displacement or disturbance should be sought. If any disturbance is repeated, it is a tolerably sure indication of something radically wrong, and the cause should be sought.

These suggestions about bridge inspection will be continued in a future number.

NEW YORK GRAIN RECEIPTS.

There is not the same interest this year as last in the course of the grain traffic, and especially is this the case with the amount brought to New York by different routes. There has not been, we believe, for many years any special effort of one of these routes to divert business from the others. The conflicts between transportation routes have been chiefly as to the amounts carried to different markets. This was the case last year, when rates were first reduced to prevent further diversions of grain from New York to Philadelphia and Baltimore. Rates to New York being the same by the three different railroads, this reduction was not likely to affect the distribution of the grain among the railroads, but it had an incidental effect on the canal shipments which was not the least interesting of the results of last year's railroad war, and has been by many supposed to be one of the objects of that contest. Last year, therefore, it was especially interesting to observe the proportion of canal shipments, rail rates being usually as low as water rates. This year, with the restoration of rail rates, we examine the figures more for the purpose of ascertaining the fluctuations of business by the different railroads,

though of course it is also interesting to see how far the restoration of the old difference between rail and water rates has served to restore business to the canal.

For the nine months ending with September the receipts of grain of all kinds at New York by the several routes have been, for four years past, as follows:

By Rail:	1877.	1876.	1875.	1874.
N. Y. Cen.	11,399,536	17,400,094	12,187,312	13,981,946
Erie	6,699,818	10,219,089	11,586,177	13,144,030
Penn	2,973,770	2,308,164	3,218,922	6,038,970
Other roads	51,424	204,775	218,061	260,822
Total by rail	21,124,548	30,132,122	27,210,472	33,425,768
By Water:				
Coastwise	1,763,424	1,737,908	498,762	426,096
North River	24,610,854	19,394,648	20,439,981	32,765,832
Total by water	26,374,278	21,132,556	20,938,743	33,191,928
Total by rail and water	47,498,826	51,264,678	48,149,215	66,617,696

The percentage of the totals were:

By Rail:	1877.	1876.	1875.	1874.
N. Y. Cen.	24.0	34.0	25.3	21.0
Erie	14.1	20.0	24.1	19.7
Penn	6.3	4.5	6.7	9.1
Other	0.1	0.4	0.5	0.4
Total rail	44.5	58.9	56.6	50.2
By Water:				
Coastwise	3.7	3.4	1.0	0.6
North River	51 8	37.7	42.4	49.2
Total water	55.5	41.1	43.4	49.8
Total rail and water	100.0	100.0	100.0	100.0

It thus appears that the railroads have carried to New York a less quantity and a smaller proportion of the whole quantity this year than in either of the three years preceding. In 1875 the total receipts at New York were about the same as this year, but then the railroads brought 56½ per cent. of the whole, against 44½ per cent. this year.

It was of course expected that the railroads would not get the same proportion of the grain this year as last, when it was determined to charge 50 to 100 per cent. more than last year. But besides the action of the railroads in advancing rates was made of greater effect for one-half of the season by a reduction of the water rates below those charged last year. That is, the difference in favor of water rates has been unusually large this season, and the natural effect has been to reduce the rail and increase the water shipments.

As an indication of the effect of the low water rates we may instance the fluctuations in the proportion of rail receipts at New York in different months of this year since navigation opened. Until about the middle of July the lake and canal rates were lower than ever before known. They have risen constantly ever since, still leaving, however, a considerable difference against the rail rates. The percentages of receipts by rail and water for the different months have been:

	June.	July.	August.	September.
By rail	25.9	17.9	32.2	33.2
By water	74.1	82.1	67.8	66.7

In June the business by rail was largely on contracts made last year at the excessively low rates of that year. In July and August the rail rate from Chicago to New York was 18 cents a bushel for wheat, while by lake and canal it began as low as 8 cents, rising gradually to about 11 or 12 cents. In September the rail rate was 21 cents, and the water rate from 12 to 15 cents.

We see that as the water rates rose, the proportion arriving by rail increased, and last month it was about one-third of the total, against about 47½ per cent. last year. And it is also notable that the proportion, as well as the quantity, carried by rail was greatest when the rail rate was highest.

Since July, the end of the last crop year, the receipts by rail and water have been:

	1877.	1876.	Increase.	P. c.
Rail	6,957,281	5,093,132	1,864,149	36.6
Water	14,327,417	5,904,155	8,423,262	142.8
Total	21,284,698	10,997,287	10,287,411	93.5

Thus, though the trunk lines are carrying a smaller proportion of the grain than last year at this time, they are carrying a much greater quantity, and as the rates received for it are probably 75 per cent. more than last year, their earnings from grain must be immensely greater this year. This applies only to the trunk lines east of the lakes, as much of their grain is received from steamer lines and not from the railroads west of Buffalo and Pittsburgh.

If we examine the proportions received by different railroads, we will notice that while there have been large decreases by the other roads this year, by the Pennsylvania there has been an increase. This is probably due partly to the cessation of the peculiar competition of markets of last year. The avowed object of the railroad war was to bring back to New York the business which Philadelphia and Baltimore had diverted from it. It thus became important for the Pennsylvania Railroad not only to get "its share" of the grain to carry, but, so far as possible, to bring it to Philadelphia or Baltimore rather than to New York. At least it carried a smaller proportion to New York than in previous years, and a great deal more to Philadelphia. This year there has been a large decrease in its deliveries at Philadelphia and an increase in those at New York. Its New York business, however, continues small in proportion to that of the other trunk lines. If we considered rail receipts only, which will best enable us to compare the different roads with each other, we will find that the percentage arriving by each was:

	1877.	1876.	1875.	1874.
New York Central	54.0	57.8	44.8	41.8
Erie	31.7	33.9	42.6	39.4
Pennsylvania	14.1	7.7	11.8	18.1
Others	0.2	0.6	0.8	0.7
Total	100.0	100.0	100.0	100.0

Here we see that though the New York Central does not quite keep the position reached last year, it is still in advance of its rank in preceding years. The Erie is lower this year than last, but has not fallen so much as from 1875 to 1876. The Pennsylvania has advanced beyond the position of the past two years.

Last year a large proportion of the New York Central's receipts came down the North River from Athens, and were so reported. This year no receipts are reported by that route. We have counted the receipts of last year *via* Athens as part of the rail receipts by the New York Central.

The receipts and shipments by rail and water, for each month of the current year, have been as follows:

	Rail.	Water.	Total.	Per ct. by rail.
January	1,951,290	233,087	2,184,377	89.4
February	1,916,156	396,212	2,312,368	82.9
March	2,295,201	261,374	2,556,575	89.8
April	2,842,269	531,647	3,373,916	84.2
May	2,788,782	2,223,357	5,012,139	55.7
June	1,440,119	4,123,242	5,563,361	25.9
July	931,450	4,277,942	5,209,392	17.9
August	3,285,348	6,918,768	10,204,116	32.2
September	3,673,933	7,408,649	11,082,582	33.2
Totals	21,124,548	26,374,278	47,498,826	44.5

The future prospect for the railroads seems very promising. Freely as the grain is now coming forward, there is no doubt that the close of navigation will leave enormous stocks in the West. The European demand is such as to make it probable that an unusually large amount will have to be brought forward before navigation in the spring, and if this is the case the railroads will have a heavy winter business for which they can obtain remunerative rates—probably as much as 40 cts. per 100 lbs. from Chicago to New York, and perhaps more. The roads had such a business in the winter of 1873–74, and there is now doubtless as much grain to be carried as there was then, though we cannot be certain that the demand will be such as to make it move as freely as it did during that winter. In that season of great and universal depression the vast grain business of the year greatly mitigated the effect of the panic to many of the railroads and to the country generally. As it then lessened the abruptness of the descending grade which has brought railroad and other interests to so low a level, so now it seems likely to start them upward again.

THE NEW YORK RAILROAD CONFERENCES.

Last week there was held in New York a series of meetings of railroad managers, in continuance of others held previously, which, although they did not in all cases finish the business before them, seem likely to have important results. Although many of those participating had to pass upon all the questions there proposed, and the general object aimed at was the maintenance of uniform and paying rates on through traffic between the East and the West, there were still three different meetings and three separate subjects for decision, neither having any dependence upon the others.

First, there was the meeting of the four trunk lines which are parties to the combination for dividing the west-bound business out of New York—a combination which had been working effectively for three months. The questions which were here discussed, it is understood, regarded a change in the proportions of freight to be shipped by the different roads. We understand that no final decision was reached in this case. There is to be a report on the subject at a future meeting, to be held next week, we believe, when an attempt will probably be made to come to a decision. We do not hear that there is any proposition to change the method of the apportionment, or that any party to it questions the great advantage secured by it over the reckless competition which it is intended to prevent. It seems to be entirely a question whether now each line gets the proportion to which it is fairly entitled—a question, of course, impossible of exact solution. Whether any company is so dissatisfied with the proportion assigned to it by the present apportionment that it will withdraw from the combination unless more is allowed it, of course we do not know. But the question as to the principles which should govern such a division of business is a very difficult one to decide, especially in the absence of exact information as to the tonnage *and rates* obtained by each line for a term of years before the agreement. It is reported, however, that the representatives of the different companies are unusually anxious to preserve harmony, and apparently willing to listen to reason and see the force of the arguments which tell against them, as well as those in their favor. This is, however, the one delicate part in the machinery of a combination. It would be easy enough to divide business and give each line "its share," if there were no differences of opinion as to the size of these shares.

Another matter, engaging a much larger number of companies, but in which the four trunk lines were also important factors, was the agreement to maintain east-bound rates. This is a much more important matter than the New York west-bound business, as it involves nearly every line north of the Ohio River, and the traffic to all the North Atlantic ports and to a good part of the interior also—a business three times as great in bulk as the entire west-bound traffic. There is no attempt at a division of this business, nor any further agreement than to maintain uniform rates as they shall be established from time to time in the usual manner, *and to establish a penalty.* It is in connection with this penalty that the trunk lines are called in. Ordinarily they have nothing to do with east-bound rates, except to accept their proportion of whatever rates their western connections may make. Nor do they now undertake to interfere in any way except at the request of these connections. These join in requesting—all join, we understand, including those which have heretofore insisted on "making their own rates to suit themselves" (which always results in making everybody's rates to suit nobody)—these all join in asking the trunk lines to refuse to accept freight from a road which shall cut rates, except as local freight at local rates, which as common carriers they are bound to do. Some method of establishing the fact of a cut in rates is, we believe, provided, but generally this agreement is without organization or machinery, and differs from ordinary agreements, openly or tacitly made whenever rates are established, only in the general adherence to it and, especially, in the provision of a penalty.

It is questionable whether such an agreement, which leaves competition as free as ever except as to rates, can be made permanently effective; but the very fact that it is made at this time indicates that there is an unusually strong and general desire to maintain rates, which renders it improbable that there will be any serious railroad war for some time to come. The plan proposed was carried out perfectly, and nothing remains to be done to bring it into effect.

The third subject of importance was the establishment of uniform rates on Boston business, in which the Boston & Albany and the New York Central on one side and the Grand Trunk on the other have the chief parts to play. The Grand Trunk has usually insisted that it should be allowed to make a lower rate out of Boston and New England, on shipments to the West, because of its greater length and liability to snow blockades in winter. It has usually got a good share of the business, but it is questionable whether, on the whole, it has made any money out of it. There was said to be at the recent meeting a disposition on its part to make and keep any fair agreement, but we believe that the exact terms of the agreement have not yet been made, but await a future conference, though there seems to be great confidence that in this case harmony will be secured.

All of these agreements strengthen each other, though entirely distinct in themselves, and make it less likely that there will be for some time to come any serious railroad war, or a recourse to unprofitable rates. A contest at Boston might not affect the New York apportionment in the slightest, so far as harmony is concerned, but it might easily make it necessary to reduce west-bound rates from all the ports; and though there might be a railroad war over east-bound business without disturbing the west-bound rates or apportionment, still such a contest is likely to lead the parties to it to a desperate conflict over all business. The maintenance of harmonious relations is all important. People who quarrel over one subject bitterly are apt to become enemies as to everything. Universally the report is that at last week's meetings there was such a decided disposition to harmony as was never before known, and though the questions at issue are not yet all settled, this disposition makes it probable that there will not be any irreconcilable differences when the final decisions are made.

Exporting Grain from Southern Ports.

We have received a letter from the Superintendent of the Port Royal Railroad, in which he takes exception to a statement made in these columns to the effect that it is not at all probable that any considerable grain export business can be done from Port Royal, and asks on what this opinion is based.

It would take a long disquisition to give all the reasons why we think that Port Royal can never have a large grain trade. It is true that it has a good harbor, but a good harbor is only one of the requisites of a great commercial city. Pensacola has a good harbor, but its foreign commerce is almost nothing (except in the lumber manufactured there), though for something like a century a great future as a seaport has been claimed for it on the strength of its harbor. Portland is another example of a city with an excellent harbor, which, in spite of great exertions, has not been able to secure a large commerce. It has aimed particularly to secure a trade in grain exports, and as proof of unquestionable advantages it has been published far and wide that it was the only Atlantic harbor where the Great Eastern could lie at the docks. But, as the re-

turns show, Portland hardly gets grain enough to load the Great Eastern once a year.

Certainly, we may assume that if the excellence of the harbor of Port Royal will attract the grain exports, which are produced chiefly a thousand miles from it, much more will it attract the cotton exports, produced almost at its doors, we may say. But in fact we find that its cotton receipts are quite insignificant, while the neighboring cities of Charleston and Savannah, with inferior harbors, receive about a fifth of the crop of the whole country. In fact, during the last crop year (ending with August last) only one cargo of cotton seems to have been shipped from Port Royal to Europe, and the entire shipments thence to foreign and domestic ports were but 28,413 bales, against 489,044 bales from Savannah (50 miles southward) and 475,654 from Charleston (50 miles northward). Now we may assume that if Port Royal's deep water makes so little impression on the trade of cities only fifty miles off, it will not make more on that of the chief grain exporting cities, which are more than ten times as far away. Aside from connections with the interior, which doubtless originally had most to do with the original establishment of all the chief Atlantic ports, with the possible exception of Boston, every existing city is in itself largely a machine for the facilitation of business—its buildings, streets, etc., procured only by the expenditure of an immense capital, being as indispensable to commerce as a harbor. This factor in the transaction of commerce is very generally neglected, in the comparison of routes and markets, though the city often has cost more than thousands of miles of the railroads leading to it, and for the most part is nearly or quite as indispensable to the conduct of commerce. It is quite probable that if South Carolina and Georgia had been first settled in the days of railroads, Port Royal would have been a great city and Charleston and Savannah only villages. The latter were largely created by the fact that they were outlets to rivers which then were the only means of transportation to and from the interior. Under these circumstances they were built, and now they afford facilities, aside from their railroad connections (which can be made to terminate at Port Royal nearly as well), which commerce needs and which no mere harbor can supply without the expenditure of tens of millions.

It is true that Port Royal is about as near in an air line to the great grain-producing country of the Northwest as is New York or Baltimore. But it is not true that it costs as little to carry from Chicago to Port Royal as to New York. The route to the southeast is over lines with a comparatively thin traffic which cannot carry so cheaply as the great trunk lines of the North, with their immense traffic and perfected appliances. Moreover, if the grain should go to Port Royal, it would cost more to send it thence to Europe than to New York. We find the rate on cotton quoted at $\frac{7}{16}$ cent per pound from Savannah when it is but $\frac{1}{4}$ cent from New York, and we assume that it is not lower from Port Royal, because the cotton does not go there for export to any extent. It is true that the difference in distance is much less in proportion than this difference in these rates, but the difference exists nevertheless, and after half a century of commerce, with large exports from Savannah and Charleston, it continues to exist. The vessels cannot get loads back. The Savannah merchants get their stocks of imported goods not in Europe but chiefly in New York, like the rest of the country, and the addition of a grain trade would not change this.

The Northern cities have the advantage for exports, moreover, because they reach the grain-producing districts by cheap water routes. The Great Lakes leave but a comparatively narrow belt between the grain fields of Minnesota, Wisconsin and Illinois and the sea, and this belt is traversed by the Erie Canal and the St. Lawrence River, the latter likely soon to be made vastly more effective than heretofore by the improvement of the Welland Canal. Indeed, the competition which New York, Philadelphia and Baltimore have to fear is not that of the South Atlantic ports, nor even that of New Orleans with deep water at the mouth of the Mississippi, but that of Montreal, if, as the Canadians promise, the Welland and St. Lawrence canals shall be so deepened and widened that the lake vessels loading at Chicago, Milwaukee and Duluth are enabled to continue their voyages with scarcely any delay and trifling expense through to the wharves of the ocean vessels in the lower St. Lawrence.

The Petroleum Traffic.

It is pretty well known that the production and movement of petroleum this year has been large without example. The reports show that for nine months the exports were 42 per cent. greater than ever before. It is also well known that during most of the year there has been a great change in the proportions carried by different railroads and the different ports on account of a disagreement between the Standard Oil Company, which controls most of the petroleum business, and the Pennsylvania Railroad Company, or more exactly, the Empire Transportation Company, which has conducted pretty much all the oil traffic passing over the Pennsylvania Railroad. It has not been so generally known, however, that one of the results of the quarrel was a material reduction in petroleum rates. The Standard Oil Company, it seems, while refusing entirely to ship over the Pennsylvania Railroad, still insisted on as low rates by the other roads as the Pennsylvania offered after it had lost the business. Exactly what the reduction was we do not know, but it seems to have left but a narrow margin of profit on a great business which can afford to and usually does pay a good profit to the carrier. The transportation charge on this material has very little effect on the consumption. The highest rate charged is but about 3¼ cents per gallon from the well to the seaboard, making a difference of but a few cents a year in the cost of an ordinary family's supply. The fact that for the four years previous to 1877, during which the price was sometimes three or four times as high as at others, the quantity exported varied but very little, indicates that the consumption will be little affected by any reasonable transportation rates.

Last month the differences between the carriers and the Standard Oil Company were settled, or at least the carriers agreed with each other to advance rates, and since September the charge has been $1.50 a barrel for refined and $1.15 for crude from the wells to New York, with lower rates to Philadelphia and Baltimore. The railroads do not get all of this, as the rate pays the charge from the well by pipe line to the railroad in the oil region, and the trunk lines get their oil not directly from the pipe lines, but from some connecting railroad, though only a small proportion of the railroad mileage is on these connections. The rates are the same from all wells in all parts of the oil regions, and are the same, we believe, for oil going to Cleveland or Pittsburgh to be refined as for the little oil refined on the spot, all refineries, apparently, being put on the same level.

Although the railroads will have to pay something from the rates now established to the pipe lines, there must still be a very good profit left to them, which on this enormous business will be a material addition to the net incomes of several lines. The rate on crude is equivalent to about 40 cents per hundred, and that on refined to 50 cents, which is higher than provision rates from Chicago, though the distance is not two-thirds as great. But, aside from the charges which the railroads have to pay, there is another serious drawback connected with this traffic: the cars can get no back cargoes. The crude is carried in special tank cars in which nothing else can be carried, and the refined if in barrels is likely to injure the box cars in which merchandise is carried west. A load of coal may be carried part of the way back in a car which brought barrels of petroleum east, but generally the charge for carrying a car-load of petroleum from the oil regions to the seaboard must cover the whole expense of hauling the car back to the oil regions.

The exports of petroleum alone, for the first nine months of this year, amounted to something more than 6,000,000 barrels. The total production in June and July was about 2,500,000 barrels, and though this rate is probably above the average even of this year, it indicates the importance of the business. The domestic consumption extends to every county in the country doubtless, so that there is an average haul on that part of the product greater perhaps than on the part exported.

One effect of the new agreement, doubtless, will be the restoration to the Pennsylvania Railroad and to Philadelphia of something like their old proportions of this traffic, which, after the difficulty with the Standard Oil Company, they had largely lost. New York this year has exported 72 per cent. of the total exports, against 56½ per cent. last year. With the Pennsylvania Railroad carrying freely to Philadelphia and Baltimore, New York cannot continue to monopolize so large a part of this business.

Record of New Railroad Construction.

This number of the *Railroad Gazette* has information of the laying of track on new railroads as follows:

Montclair & Greenwood Lake.—Extended from Cooper, N. J., north by east to State Line, 3 miles.

Cheraw & Chester.—The first track is laid from Chester, S. C., east 5 miles. It is of 3 ft. gauge.

Galveston, Brazos & Colorado.—During the present year this road has been extended 5 miles, to a point 15 miles west from Galveston, Tex.

Scioto Valley.—Extended north 15 miles to Waverly, O.

Fond du Lac, Amboy & Peoria.—Extended from Mayville, Wis., southward to Warrior Ridge, 12 miles. It is of 3 ft. gauge.

Rock Island & Mercer County.—Extended southward 9 miles to Cable, Ill.

Burlington, Cedar Rapids & Northern.—The *Pacific Division* is extended from Grundy Centre, Ia., to Holland, 3 miles.

Colorado Central.—The extension of the *Georgetown Branch* to Georgetown, Col., is 4 miles longer than previously reported. It is of 3 ft. gauge. On the extension of the standard-gauge line from Longmont to Hazard track is extended 21 miles, to Fort Collins, Col.

Northern Pacific.—The *Puyallup Branch* is extended 19 miles, to the Puyallup Mines, completing the road.

South Pacific Coast.—On the *Alameda Extension* track is laid from Newark, Cal., north to San Lorenzo, 13 miles. It is of 3 ft. gauge.

This is a total of 109 miles of new railroad, making 1,505 miles completed in the United States in 1877, against 1,719 miles reported for the corresponding period in 1876, 861 in 1875, 1,125 in 1874, 2,867 in 1873, and 5,066 in 1872.

VERY LARGE CARS (to carry 20 tons each, we believe) were recommended some two years ago by a careful German railroad man, especially for coal traffic, since which time we have heard nothing of them until now, when we find the Belgian State Railroads advertising for bids for 81 eight-wheeled flat cars to carry 44,000 lbs. each. There are capable railroad men in this country who believe that it would be economy to make cars larger, or at least to carry greater weights, and indeed there has been a quite general tendency of late to increase loads, though probably without much change in the construction of cars. A few years ago 20,000 or 22,000 lbs. was generally a maximum car-load. Now 26,000 lbs. is the advertised limit between Chicago and the East, and according to a report widely published 16,000 bushels of wheat were taken last week from Buffalo to New York over the New York Central & Hudson River Railroad in a train of 35 cars, which is at the rate of 27,430 lbs. per car. The recent advances in this country have been due, probably, chiefly to improved tracks and road-beds, and in some cases to larger axles; but that we have not yet reached the limits of the possible is indicated by the fact that in Europe the standard freight car carries 22,000 lbs. on *two* axles—little if any larger than the master car-builders' standard. The cars themselves, however, are considerably lighter than ours.

IMPROVEMENTS IN THE QUALITY OF IRON RAILS were much talked of a year ago as likely to at least enable iron to divide the field with steel in future. Mr. Isaac Lowthian Bell, one of the greatest of living metallurgists, conducted the experiments, but the confident statements made of the quality and cheapness of the new product could not be based justly on Mr. Bell's reports, which were quite modest and moderate. He now reports a continuance of the experiments, with the result that the iron rails produced cannot compete with steel at the present small difference in prices—only $2.50 a ton in England. The experiments were made especially for the purpose of securing a use for Cleveland iron ores, which suffer particularly from the introduction of steel, as the iron from these ores has too much phosphorus to be fit for the Bessemer process. Mr. Bell is now experimenting with a view to ascertain whether the phosphorus cannot be removed from Cleveland iron so as to make it fit for steel making. The fact appears to be that even if iron could be made as durable as steel it would be of little advantage, as the Bessemer works apparently can produce steel rails about as cheaply as the iron works can turn out good iron rails. There is sometimes a considerable difference in the price, but it seems chiefly due to the fact that iron is sold without profit, while steel is not.

BRITISH RAILROAD ACCIDENTS, according to the Board of Trade Report, in 1876 killed 1,245 and injured 4,724 persons. Of these 139 killed and 1,883 injured were passengers, and of these 38 were killed and 1,297 injured "from causes beyond their own control." We are unable to compare these with our own record, which is for train accidents only. It showed 328 persons killed and 1,097 injured in 1876. This takes no account of the very large number of employes injured or killed without accident to trains, or of the other large number of trespassers, killed while walking on tracks, etc. In New York alone, however, during the year ending with September, 1876, the companies reported 13 passengers, 79 employes and 114 "others" killed, and 89 passengers, 226 employes and 81 "others" injured from all causes on their roads. It is notable that while 7,425 miles of New York steam railroads killed 13 and injured 89 passengers in a year, 422 miles of horse railroads killed 8 passengers and injured 67 in the same year. This indicates that a mile of horse railroad is more than ten times as deadly to passengers as a mile of steam railroads.

SIR EDWARD WATKIN, who we reported to have resigned the Chairmanship of the Southeastern Railway, has, it appears, not resigned, while his son, Mr. A. M. Watkin, Locomotive Superintendent of that road, who was recently elected a Member of Parliament, is reported to have sent in his resignation to the Southeastern board the day after his election, though it did not reach them until a meeting had been held and a majority of those present had voted to relieve him of his duties. Our information came from the London *Railway News*, which has been hostile to Sir Edward Watkin ever since he took up a position antagonistic to James McHenry in the Erie affairs.

THE AMERICAN INSTITUTE OF MINING ENGINEERS will hold its October meeting at Amenia, Dutchess County, N. Y., beginning Tuesday evening, Oct. 23, at 8 o'clock. Amenia is a little village on the Harlem Railroad, which is near hematite iron ore beds, which will be visited during the meeting, during which visits will also be made to the Salisbury and Richmond mines, to the Barnum, Richardson & Co. car wheel works at Lime Rock, and to the Copake Iron Works.

FREIGHT FROM CHICAGO TO LIVERPOOL, not including elevator and transfer charges, four months ago was at the rate of about 15 cents for a bushel of wheat, by the lake, canal and ocean route. Now it is about 35 cents. While there has thus been an increase of 133⅓ per cent. in the water rates the rail rates have been advanced just 16⅔ per cent. The lake and canal vessels now charge 10 cents a bushel more between Chicago and New York than they did at the beginning of July; the railroads 3 cents more.

THE INDIAN FAMINE seems to be an ill wind which blows the Indian railroads great good. Their earnings are increasing enormously, the percentages of increase for the first half of this year on six leading lines being reported at 37, 55, 230, 138, 47 and 43 per cent., and for later weeks the increases appear to be even greater.

THE MASTER CAR-BUILDERS' ASSOCIATION MONTHLY MEETINGS are to be continued during the coming winter. The first meeting will be held at the rooms of the Association, No. 113 Liberty street, New York, on the evening of Thursday, Oct. 18, and will be devoted chiefly to making arrangements for the series of meetings for the season.

Experience with Car Wheels in Switzerland.

Some time ago a European correspondent took the pains to inquire of some Swiss master mechanics as to their experience with car wheels, and especially as to the life of wrought-iron

wheels and car tires. Their replies, which our correspondent has kindly sent us, indicate that there is there a lack of definite information as to the mileage made by cars and wheels, and, generally, we have estimates instead of recorded facts.

Their statements are substantially as follows:

Mr. Macy, Chief Engineer of Machinery of the Swiss Northeastern writes from Zurich, March 29, 1877, saying that he gives such information as their statistics supply. He says:

"The average number of kilometres run by wheels until it is necessary to take them out of service is:

Under passenger cars..... 420,000 to 450,000 [260 870 to 280,000 miles].
Under freight cars ..... about 550,000 [341,615 miles].

"The tires are turned off after running 28,000 miles under passenger cars and 77,600 under freight cars, and as a rule each tire has ten such periods under a passenger car and four under a freight car.

"The diameters of wheels vary from 880 to 1,000 millimetres [34⅝ to 39⅜ in.], and the loads which they have to carry vary from 2¼ to 3¾ tons [of 2,200 lbs.] per tire. The life of the wheel centres is:

—— wheels with wrought-iron centres..... 20 years.
" " " cast-iron " ..... 15 "
Arbel " " wrought-iron " ..... 12 to 15 "

Mr. A. Rodieux, Chief Engineer of Motive Power of the Swiss Western Railroad, writes from Yverdun under date of March 24, 1877:

"I regret to inform you that we have only very few records of experience as to the service of steel tires. As our road has many and steep grades, the tires are much sooner rendered unfit for service by the use (or misuse) of the brakes, than by the natural wear.

"We give below some figures for the distances run under baggage cars, when flat places had not been made by misuse of brakes: 101,898, 105,599, 108,508 kilometres [62,258, 62,448 and 62,665 miles]. On the other hand others had to be removed because of flat places, caused by bad braking, after running 81,436, 69,645, 63,564, 55,098, 48,472, 45,583, 44,464, 37,664 kilometres [50,582, 43,320, 39,480, 34,222, 30,107, 28,362, 27,617 and 23,395 miles]. When there is no flat spot worn, a steel tire can be turned off eight or ten times, until its thickness at the tread is reduced to ¾ in., the least admissible.

"Our wheel centres are of 910 millimetres (36 in.) diameter; but there are some under old cars of the American style 750 millimetres (30 in.) in diameter. The wheel centres of Deflassieux, Arbel and Brunon have turned out well, while in general cast-iron centres have given bad results. Our cars are made with capacity for 10,000 kilograms (22,000 lbs.) load."

Mr. Egger, Master of Machinery of the Swiss Central Railroad, writes from Olten March 28 of this year:

"An axle with steel-tired wheels is used on the Swiss Central about eight months under passenger cars, and four years under freight cars. Afterwards it becomes necessary to turn the tires to make them of equal diameter, whereupon the axle wears a similar period again. As the diameter of the wheel becomes smaller by about 10 to 12 millimetres (0.4 to 0.5 in.) at every turning, the steel tire can be turned five times. Thus a steel-tired wheel is able to pass through six periods of service of 4⅝ years each, and so is good from 6×4⅝=28 years' service. Since a Swiss Central passenger car-axle runs an average of 28,000 kilometres per year, and a Swiss Central freight car-axle 13,000 kilometres, an axle in the period of 4⅝ years makes (⅝×23,000) + (4×13,000)=(in round figures) 70,000 kilometres [43,500 miles] and during the six periods in all 6×70,000=420,000 kilometres [261,000 miles]. This result, it is true, is not yet attained in practice, as the Swiss Central Railroad first began to use wheels with steel tires in 1863. Up to this time only those tires have been discarded which have been damaged (chiefly by sliding). But since cast-iron brake blocks have been used, sliding occurs much less frequently, so that the above total number of kilometres of average serviceability of a steel tire will be nearly attained.

"The Swiss Central cars have an average weight of three tons per axle, and the average load (including empties) amounts to two tons per axle, so that the average weight carried by a Swiss Central car axle is five tons.

"The inside diameter of tires is 0.750, 0.789 and 0.900 millimetres (30, 31⅛ and 35½ inches); the thickness of the tire, 40 to 50 millimetres (1⅛ to 2 in.)."

Definite information as to the actual average mileage of steel car-wheel tires and of wrought-iron wheels we have not yet been able to obtain.

NEW PUBLICATIONS.

The American Journal of Pure and Applied Mathematics is to be the title of a new mathematical journal published at Baltimore under the auspices of the Johns Hopkins University, and edited by its Professor of Mathematics, Dr. J. J. Sylvester, said to be an extraordinary mathematical scholar, assisted by Prof. Peirce, of Harvard, in mechanics; by Prof. Simon Newcomb, of the Naval Observatory, in astronomy, and Prof. H. A. Rowland, in Physics, with Wm. E. Story as associate editor in charge. This is an extraordinarily strong staff, sure to make the new periodical of great value to those who investigate the higher mathematics. This is a small class everywhere, and extremely small in this country, but they do a work of great importance to the advancement of science generally, not sufficiently appreciated by the non-mathematical, or those who make use of its ordinary applications, they being for the most part ignorant of the fact that it is a progressive science. The more is the need of some means of communication among these widely-scattered investigators, who often cannot hope for much personal intercourse with those pursuing similar studies.

The new periodical is to be a quarto similar in form to the old *Mathematical Monthly*. At present it is to be published quarterly, making a yearly volume of 384 pages. The subscription price is five dollars. Communications concerning it should be addressed to Wm. E. Story, at the Johns Hopkins University, Baltimore.

The Application of Electricity to Railway Working, by W. E. Landor, is the title of a book announced by Macmillan & Co. for the fall and winter season. It is to be "fully illustrated."

Contributions.

Exports from Port Royal.

AUGUSTA, Ga., Sept. 11, 1877.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I notice in your issue of the 7th inst. the following remarks, under head of "Grain Shipments to Charleston:"

"It is not at all probable that any considerable business can be done by this port." * * *

If you mean that the business cannot be done via Port Royal, I beg to ask upon what you base your opinion. Are you posted as to the vast advantages Port Royal possesses over the other South Atlantic ports? Do you know the depth of water at Port Royal, and are you aware of the fact that vessels very often take in part of cargo at New Orleans and touch at Port Royal to complete it, owing to the fact that there is more water at Port Royal than at New Orleans, vessels drawing 27 and 28 feet being able to come alongside docks to take cargoes, and cars coming within thirty yards of ship's side?

We are using every effort to build up an export business through Port Royal, and we cannot see any just reason why our efforts should not be successful. R. G. FLEMING,

General Superintendent, Port Royal Railroad.

General Railroad News.

ELECTIONS AND APPOINTMENTS.

Buffalo, New York & Philadelphia.—At the annual meeting in Buffalo, N. Y., Oct. 3, the following directors were chosen: James Brayley, Richard Bullymore, Cyrus Clarke, Thomas Clark, Wm. G. Fargo, George B. Gates, Wm. H. Glenny, C. J. Hamlin, Sherman S. Jewett, George J. Magee, James H. Metcalfe, Bronson C. Rumsey, J. F. Schoellkopf.

Cairo & Vincennes.—Mr. T. E. Clarke has been appointed Trainmaster and Superintendent of Telegraph, with office at Cairo, Ill. He was recently Car Accountant of the Houston & Texas Central.

Chicago & Lake Huron.—The office of Assistant Superintendent is suspended and that of Division Superintendent restored. Mr. Fred L. Clark (late Assistant Superintendent) is appointed Superintendent of the Western Division. Mr. Henry Funnell is appointed Superintendent of the Eastern Division, and will act also as Roadmaster. Mr. Wm. Taylor is appointed Roadmaster of the Western Division.

Concord & Portsmouth.—At the annual meeting in Manchester, N. H., Oct. 4, the old board was re-elected, as follows: Stephen Kenrick, Benjamin F. Martin, Joseph B. Walker, Nathan Parker, John J. Pickering, Samuel N. Bell, John J. Bell. The board re-elected Stephen Kenrick President; Wm. H. Hackett, Clerk.

Conductors' Brotherhood.—At the annual convention in Elmira, N. Y., Oct. 6, the following officers were chosen for the ensuing year: Past Grand Chief Conductor, John Silsbee, Binghamton, N. Y.; Grand Chief Conductor, W. S. Collins, Hornellsville, N. Y.; Assistant Grand Chief Conductor, C. A. Stanchfield, Creston, Ia.; Grand Secretary and Treasurer, J. C. Whisson, Newark, O.; Grand Conductor of Ceremonies, J. R. Sandy, Chicago; Grand Inside Sentinel, A. Rogers, Moberly, Mo.; Grand Outside Sentinel, J. F. Division, Philipsburg, N. J.; Executive Committe, E. S. Wheaton, Elmira, N. Y.; F. B. Kimball, Port Jervis, N. Y.; A. A. Sharp, Macon, Ga.; Editor of Magazine, J. W. Bogles, Omaha, Neb.

Cumberland Valley.—At the annual meeting in Harrisburg, Pa., Oct. 2, the following directors were chosen: Frederick Watts, Carlisle, Pa.; Thomas B. Kennedy, Daniel O. Gehr, Chambersburg, Pa.; Josiah Bacon, Thomas A. Biddle, Strickland Kneass, Wistar Morris, George B. Roberts, Thomas A. Scott, Edmund Smith, John Stewart, Philadelphia. There is no change from last year. The board re-elected Thomas B. Kennedy President.

Denver Pacific.—Mr. W. R. Robinson has been appointed Auditor, in place of Charles D. Smith, deceased. His office is in Denver, Col.

Grand Trunk.—Mr. F. H. Small, heretofore in charge of this company's passenger business in the Maritime Provinces, has had the State of Maine added to his district, and will hereafter have his headquarters at Bangor, Me.

Gulf Colorado & Santa Fe.—At the annual meeting in Galveston, Tex., Oct. 2, the following directors were chosen: J. H. Hurt, J. M. Brown, M. Kopperl, J. E. Wallis, C. B. Lee, A. H. Belo, Wm. J. Jones, C. G. Wells, John D. Rogers, Leon Blum, H. Seeligson, H. Kempner, F. C. Hume. Messrs. Wells, Blum, Rogers, Seeligson, Kempner, Hume and Belo, a majority of the board, are new directors. Some objection was raised to the legality of the election, the opposition claiming that the Galveston County stock ought not to be voted for the whole number of directors, but the election was held valid.

Hannibal Bridge.—At the annual meeting in Springfield, Ill., Oct. 3, the old directors were re-elected, as follows: A. M. White, A. M. Boody, A. W. Lamb, C. M. White, A. B. Baylis. The directors re-elected Alex. M. White, President, and A. T. White, Treasurer.

Housatonic.—Mr. N. Slingland has been appointed Master Mechanic, in place of Chauncey Morris, resigned. Mr. Slingland has been on the Connecticut Western some time.

Houston & Texas Central.—Mr. G. Jordan, Vice-President, has been appointed General Manager also. Mr. R. M. Elgin has been appointed Land Agent. Mr. Jordan was for several years General Superintendent of the Memphis & Charleston, and is, we believe, a civil engineer by profession.

Iron Mountain, Chester & Eastern.—Mr. J. L. Hinckley is appointed Superintendent, in place of Egbert Dodge. His office is at Chester, Ill.

Long Island.—The board of directors has elected Col. Thomas R. Sharp President, in place of Adolph Poppenhusen, resigned. Col. Sharp is well known as the present Master of Transportation of the Baltimore & Ohio, but better known in New York probably as Superintendent of the New Jersey Southern. It is said that he has accepted and will very soon take charge of the Long Island lines.

Louisville & Nashville.—At the annual meeting in Louisville, Ky., Oct. 3, the following directors were chosen: E. D. Standiford, H. Victor Newcomb, B. F. Guthrie, W. B. Caldwell, W. H. Smith, H. C. Murrell, W. M. Farrington, George A. Washington, P. J. Potter, George H. Hutchings, James W. Hayes. The board re-elected Dr. E. D. Standiford President; H. Victor Newcomb, Vice-President.

Newburg, Dutchess & Connecticut.—Mr. John S. Schultze, late Vice-President, has been chosen Secretary and Treasurer, in place of J. F. Joy, resigned. His office is at Dutchess Junction, N. Y.

Northern Central.—Mr. Stephen W. White has been chosen Secretary, in place of Robert S. Hollins, resigned.

Ogdensburg & Lake Champlain.—Mr. Loring S. Richardson has been appointed Auditor and General Ticket Agent, with office at Ogdensburg, N. Y.

Owensboro & Nashville.—The officers of this company are now as follows: President, J. G. Barrett; Secretary and Treasurer, George T. Wood, Louisville, Ky.; Superintendent, D. F. Whitcomb, Owensboro, Ky.

Pennsylvania Petroleum.—Hon. John Fertig, of Titusville, Pa., has been appointed Receiver.

Pittsburgh & Lake Erie.—Mr. Sebastian Wimmer has been appointed Chief Engineer, and has his office at No. 79 Fourth avenue, Pittsburgh, Pa.

St. Louis & Southeastern.—The following order has been issued by the Receiver and General Manager:

1. The office of Superintendent Rolling Stock is hereby abolished. Mr. L. B. Salisbury is announced as Superintendent of Machinery, and is charged with the supervision of the machinery, motive power, rolling stock and water supply of this railroad.

2. The office of General Foreman of Nashville Division is hereby discontinued. Mr. E. M. Humstone is appointed Master Mechanic of the Nashville Division, and will report to and receive all orders from the Superintendent of Machinery.

St. Paul & Pacific.—Mr. James Doran is now General Freight and Ticket Agent, with office at St. Paul. Minn.

Southwestern Railroad Rate Association.—Mr. John Crampton has been appointed General Agent, with office at Kansas City, Mo. He was formerly General Freight Agent of the Great Western, of Canada, but recently has been assistant of Mr. Albert Fink, in the New York apportionment of west-bound freight. He is especially well qualified for his new position.

Southern Railway & Steamship Association.—At the annual meeting in Atlanta, Ga., Oct. 3, the old officers were re-elected, as follows: President, Hon. Joseph E. Brown; General Commissioner, Virgil Powers; Secretary, C. A. Sindall.

Western Union Telegraph.—At the annual meeting in New York, Oct. 10, the following directors were chosen without opposition: William Orton, William H. Vanderbilt, Edwin D. Morgan, Robert Lenox Kennedy, Moses Taylor, August Schell, Wilson G. Hunt, J. Pierrepont Morgan, Frank Work, Harrison Durkee, Cornelius Vanderbilt, James H. Banker, Chester W. Chapin, Alonzo B. Cornell, Hamilton McK. Twombly, George M. Pullman, Norvin Green, William K. Thorn, John R. Duff, Cambridge Livingston, Darius O. Mills, Oliver H. Palmer, Edwards S. Sanford, Samuel A. Munson, David Jones, Joseph Harker, Anson Stager, Samuel F. Barger, Edwin D. Worcester.

PERSONAL.

—Mr. Robert S. Hollins, Secretary of the Northern Central Railway Company, has resigned his position after serving the company no less than 45 years in various capacities. The board has adopted suitable resolutions in recognition of Mr. Hollins' long, efficient and faithful services.

—Mr. O. M Shepard, Assistant General Superintendent of the St. Louis & Southeastern, was recently presented with a valuable gold watch and chain by the employes of the road.

—Mr. Chauncey Morris has resigned his position as Master Mechanic of the Housatonic Railroad.

—Henry R. Sibley, Boston Agent for the Atchison, Topeka & Santa Fe road, has been arrested on charges of forging signatures and endorsements to promissory notes. His forgeries do not in any way affect the company's business.

—Mr. Thomas Donaldson, an old and respected lawyer and a director of the Philadelphia, Wilmington & Baltimore Company, died last week at his residence near Baltimore.

—R. S. Foster, Assistant Treasurer of the Grand Trunk Company at Montreal, is reported to be a defaulter to an amount as yet unknown, and has left for parts unknown. Besides the loss to the company, he is said to have stolen a considerable amount from the employes' superannuation fund, of which he had charge.

—Mr. W. W. Peabody, General Superintendent of the Ohio & Mississippi, and late of the Marietta & Cincinnati, was recently presented with a valuable silver set by the employes of his old road.

—Mr. J. H. Devereux, President of the Cleveland, Columbus, Cincinnati & Indianapolis, and Receiver of the Atlantic & Great Western, is a delegate from the diocese of Northern Ohio to the General Convention of the Protestant Episcopal Church, now in session in Boston, and takes a prominent part in the proceedings. In one of the debates Mr. Devereux made extended reference to his experience during the recent strikes.

TRAFFIC AND EARNINGS.

Coal Movement.

Coal tonnages are reported as follows for the nine months ending Sept. 29, the tonnage in each case being that originating on the line to which it is credited:

	1877.	1876.	Inc. or Dec.	P. ct
Anthracite:				
Philadelphia & Reading	4,915,701	3,168,698	Inc .. 1,747,003	55.1
Northern Central, Shamokin Div. and Sum'it Branch R. R.	436,468	617,902	Dec.. 181,434	29.4
Central of N. J., Lehigh Div.	1,948,735	1,889,863	Inc .. 58,872	3.1
Danville, Hazleton & Wilkesbarre	19,032	31,702	Dec.. 12,670	40.0
Pennsylvania Canal	241,342	288,882	Dec.. 47,540	16.5
Lehigh Valley	2,995,125	2,533,168	Inc .. 461,957	18.2
Pennsylvania & N. Y.	32,931	17,488	Inc .. 15,443	88.2
Delaware, Lack'wan'a & Western	1,318,622	1,180,430	Inc .. 138,192	11.7
Delaware & Hudson Canal Co	1,283,899	1,362,389	Dec.. 78,490	5.8
Pennsylva'ia Coal Co.	718,101	733,159	Dec.. 14,968	2.0
State Line & Sullivan	13,145	27,663	Dec.. 14,518	52.4
Total anthracite	13,923,091	11,851,344	Inc .. 2,071,747	17.5
Semi-bituminous:				
Cumberland, all lines	1,105,691	1,229,994	Dec.. 124,303	10.1
Huntingdon & Broad Top	102,375	116,338	Dec.. 13,963	12.0
Tyrone & Clearfield	1,012,853	880,711	Inc .. 132,142	15.0
Total semi-bitumin's.	2,220,919	2,227,043	Dec.. 6,124	0.3
Bituminous:				
Barclay R. R.	244,070	247,674	Dec.. 3,604	1.5

Coal shipments from Pictou, N. S., for the nine months ending Sept. 30 were 117,413 tons, of which 20,243 tons went to the United States, 41,960 tons to Canadian ports and the rest to the West Indies and other British colonies.

The coal shipments on the New York State canals from the opening up to Sept. 30 were:

	1877.	1876.	Inc. or Dec.	P.c.
Anthracite	693,095	533,791	Inc .. 159,304	29.8
Bituminous	194,364	211,814	Dec.. 17,450	8.2
Total	887,459	745,605	Inc .. 141,854	19.0

The clearances this year from tide-water points were 610,653 tons, and from interior points 276,806 tons, against 324,390 tons from tide-water points and 421,215 tons from interior points in 1876.

It is thought probable that the miners of the Delaware, Lackawanna & Western, the Delaware & Hudson Canal and the Pennsylvania Coal Co. will soon resume work. All three companies decline to make any agreements until the men have gone to work, but promise then to consider fairly all statements of grievances.

There have been many reports of a new combination of all the other anthracite companies against the Reading. They are, however, denied by parties interested.

Water Rates.

Lake and canal rates have advanced. Quotations for Tuesday of last week were 4¼ cents a bushel for wheat, 4½ for corn and 3½ for oats from Chicago to Buffalo; but there was an advance the next day, and last Tuesday the quotations were 6 cents for wheat and 5¼ for corn. By canal the rates Tuesday of last week, as they had been for three weeks, were 8 cents

for wheat and 7 for corn from Buffalo to New York. These rates advanced one cent the next day, and they closed Tuesday of this week at 10¼ for wheat, 9¼ for corn, 9¼ for barley and 6 cents for oats, and at these rates there is a great scarcity of boats.

Ocean rates last Tuesday are reported as follows from New York to Liverpool: Grain by steam, 9d. to 9½d. per bushel; cotton, ¼d. to ⅝d. per pound; bacon, 40s. per ton; cheese, 45s. to 50s. per ton; flour by sail, 2s. 7½d. per barrel. To Cork for orders by sail: Grain, 7s. 1½d. per quarter.

Railroad Earnings.

Earnings for various periods are reported as follows:

	1877.	1876.	Inc. or Dec.	P. c.
Nine months ending Sept. 30:				
Atchison, Topeka & Santa Fe	$1,763,799	$1,746,816	Inc.. $16,983	1.0
Bur., Cedar Rapids & Northern	809,809	831,234	Dec.. 21,425	2.6
Central Pacific	12,036,107	13,136,195	Dec.. 1,100,088	8.4
Chicago & Alton	3,302,720	3,685,410	Dec.. 382,690	10.4
Chicago, Milwaukee & St Paul	5,372,460	5,861,393	Dec.. 488,933	8.3
Grand Trunk	6,711,980	6,978,467	Dec.. 266,487	3.8
Great Western, of Canada	2,780,875	2,964,955	Dec.. 184,080	6.6
Illinois Central, Ill. lines	3,621,110	4,036,929	Dec.. 415,819	10.3
Ind., Bloom. & West'n	914,667	1,117,691	Dec.. 203,024	18.2
International & Great Northern	998,560	859,060	Inc.. 139,500	16.2
Kansas Pacific	2,271,893	2,154,821	Inc.. 117,072	5.4
Missouri, Kansas & Texas	2,314,584	2,260,652	Inc.. 53,932	2.4
St. Louis, Iron Mt. & Southern	2,985,326	2,606,047	Inc.. 379,279	14.6
St. Louis, Kansas City & Northern	2,228,910	2,263,520	Dec.. 34,610	1.5
St. Louis & San Francisco	963,036	951,680	Inc.. 11,356	1.2
Wabash	3,210,421	3,205,328	Inc.. 5,093	0.2
Eight months ending Aug. 31:				
Chicago, Burlington & Quincy	$7,531,512	$7,549,622	Dec.. 18,110	0.2
St. Louis & Southeastern	689,668	683,888	Inc.. 5,780	0.8
Net earnings	128,355	115,653	Inc.. 12,702	11.0
Per cent. of exps	81.35	83.08	Dec.. 1.73	2.1
Month of July:				
Erie	$1,041,205	$1,192,980	Dec.. $151,775	12.7
Net earnings	171,316	304,461	Dec.. 133,145	43.7
Per cent. of exp's	83.56	74.48	Inc.. 9.08	12.2
Month of August:				
Atlantic & Great Western	$422,016	$303,706	Inc.. $118,310	39.0
Chicago, Burlington & Quincy	1,330,249	1,049,871	Inc.. 280,378	26.7
Houston & Texas Central	199,875	208,106	Dec.. 8,231	4.0
Net earnings	67,889	55,478	Inc.. 12,411	21.3
Per cent. of exps	66.03	73.34	Dec.. 7.31	10.0
Month of September:				
Atchison, Topeka & Santa Fe	$284,414	$254,014	Inc.. $30,390	12.0
Bur., Cedar Rapids & Northern	194,226	90,800	Inc.. $103,426	113.9
Central Pacific	1,420,535	1,871,875	Dec.. 451,340	24.1
Chicago & Alton	473,323	524,244	Dec.. 50,921	9.7
Chicago, Milwaukee & St. Paul	1,180,000	645,831	Inc.. 534,169	82.7
Chicago & Northw'n	1,540,000	1,182,830	Inc.. 357,170	30.3
Illinois Central, Ill. lines	563,015	488,594	Inc.. 64,421	15.2
Illinois Central, Iowa lines	191,239	127,698	Inc.. 63,541	49.8
Ind., Bloom. & West'n	121,909	121,378	Inc.. 531	0.4
International & Great Northern	136,000	133,102	Inc.. 2,898	2.2
Kansas Pacific	341,661	30[illegible],959	Inc.. 39,702	13.1
Missouri, Kansas & Texas	307,179	324,144	Dec.. 16,965	5.2
Missouri Pacific	347,991	370,015	Dec.. 22,024	6.0
Peoria & Rock Island	35,328	[illegible]	[illegible]	[illegible]
St. Louis, Iron Mt. & Southern	410,700	354,914	Inc.. 46,786	13.2
St. Louis, Kan. City & Northern	321,180	290,600	Inc.. 30,580	10.5
St. Louis & San Francisco	13[illegible],990	137,416	Dec.. 4,426	3.2
Wabash	462,165	425,142	Inc.. 37,023	8.7
Week ending Sept. 28:				
Great Western, of Canada	$113,736	$99,003	Inc.. $14,733	14.9
Week ending Sept. 29:				
Grand Trunk	$228,056	$193,044	Inc.. $35,012	18.1

Lake and Canal Rates.

The Buffalo *Commercial Advertiser* of Oct. 6 says:

"The country did not recover from the effects of the terrible financial collapse of 1837 until kind nature blessed with an abundant harvest some years later. Good crops gave business an impetus which obliterated all marks of depression. There is every reason to hope the magnificent harvest of this year will produce the same result. The transportation interests are already experiencing the benefit of a large yield. The lake fleet is now, and has been for over a month, fully employed, at fairly remunerative rates. The following comparative exhibit, giving the average rate by lake on wheat and corn from Chicago to Buffalo, and also the average on the same cereals from Buffalo to New York by canal, tells its own story of better prices:

	Lake.		Canal.	
Years.	Wheat. cents.	Corn. cents.	Wheat. cents.	Corn. cents.
1868	9.1	7.0	16.2	13.6
1869	6.5	6.6	16.0	13.7
1870	5.6	4.1	10.8	10.0
1871	9.6	9.0	11.3	12.5
1872	14.8	13.8	12.5	11.6
1873	12.6	11.6	11.8	10.1
1874	3.5	3.2	9.5	8.5
1875	2.5	2.2	7.0	6.4
1876	2.6	2.3	6.2	5.6
1877	4.0	3.4	7.7	6.7

"From this it will be seen that the average by lake for the month was 1.4 cents higher than for September, 1876, while by canal the increase is equal to 2.0 cents when the difference in tolls is considered. This of itself is good evidence of better times; but when taken in connection with the fact that this year every craft fit to carry grain is in business, while last season hundreds were tied up, it shows what an extended influence the cereal movement is having. Nor does it stop here. The advance in grain rates has compelled coarse-freight shippers to pay better prices or allow their property to remain where it was. For example, most of the vessels in the iron-ore trade are available for grain transportation when desired; hence when rates at Chicago and Milwaukee went up, ore freights at Marquette at Escanaba had to follow. Thus the large grain shipments are imparting life and strength to every other branch of the lake business."

Petroleum Exports.

The total petroleum exports for the nine months from Jan. 1 to Sept. 29 have been, for five years, in gallons:

1877.	1876.	1875.	1874.	1873.
268,870,683	188,468,019	183,363,960	189,343,090	172,810,335

This shows an increase this year of 42 per cent. over any previous year.

Richmond, Norfolk and Portland appear this year for the first time in the list of exporting cities, credited altogether with 2.4 per cent. of the whole. The proportion of exports from each of the other four cities has been, for the past four years:

	1877.	1876.	1875.	1874.
New York	71.8	56.6	61.6	64.4
Philadelphia	12.6	26.4	25.8	31.8
Baltimore	12.1	16.0	11.6	2.3
Boston	1.2	1.0	1.0	1.5

Although New York has not quite kept its position at the end of August, it is still enormously ahead of the business of any previous year. Baltimore and Philadelphia did better in September than for several months previous, and probably the new arrangement between the railroad companies, and the settlement of the difficulties between the Pennsylvania Railroad Company and the Standard Oil Company will make a great change in the future in favor of those cities, which may now be able to recover their former position in the export trade. An increase in the proportion of exports from these cities and a decrease in that from New York is to be looked for hereafter.

Iron Ore Movement.

Shipments of iron ore from the Lake Superior region from the opening of navigation up to Sept. 29 were:

	1877.	1876.	Inc. or Dec.	P. c.
From Marquette, tons	458,030	379,856	Inc.. 78,174	20.6
From Escanaba	305,642	286,432	Inc.. 19,410	6.8
From L'Anse	51,831	67,235	Dec.. 15,404	22.9
Totals	815,703	733,523	Inc.. 82,180	11.2

The pig iron shipments for the same period from Marquette were 9,587 tons.

Petroleum Movement.

Stowell's *Petroleum Report* gives the production of the Pennsylvania oil wells for August at 1,273,759 barrels; shipments, 1,425,943 barrels.

Pittsburgh shipments of refined oil for August were:

	Barrels.
East by Pennsylvania Railroad	31,825
East by Baltimore & Ohio R. R.	77,902
Total	109,727

Grain Movement.

Receipts and shipments for the nine months ending Sept. 29 are reported as follows, flour in barrels and grain in bushels:

	1877.	1876.	Inc. or Dec.	P. c.
Flour:				
Lake ports' receipts	3,158,146	3,822,303	Dec.. 664,157	17.4
" " shipments	3,346,735	3,146,319	Inc.. 200,416	6.4
Atlantic ports' receipts	5,255,550	6,917,132	Dec.. 1,661,582	24.0
Wheat:				
Lake ports' receipts	29,006,718	37,133,678	Dec.. 8,126,960	21.9
" " shipments	24,480,273	34,928,428	Dec..10,448,155	29.9
Atlantic ports' receipts	19,698,130	31,439,174	Dec..11,741,044	37.3
Corn:				
Lake ports' receipts	63,387,624	62,383,139	Inc.. 1,034,485	1.7
" " shipments	55,803,787	58,430,494	Dec.. 2,626,707	4.5
Atlantic ports' receipts	66,635,921	67,191,228	Dec.. 555,307	0.8
Grain of all kinds:				
Lake ports' receipts	118,860,110	134,644,912	Dec..15,784,802	11.7
" " shipments	98,437,242	112,608,642	Dec..14,171,400	12.6
Atlantic ports' receipts	104,445,839	120,704,122	Dec..16,258,283	13.5

For the past five years the total grain receipts and shipments for the corresponding nine months have been:

	1877.	1876.	1875.	1874.	1873.
Lake ports' receipts	118,860,110	134,644,912	107,078,154	135,539,026	130,012,111
Lake ports' shipments	98,437,242	112,608,642	108,317,011	102,635,296	100,978,744
Atlantic p'rts receipts	104,445,839	120,704,122	99,050,212	108,824,729	90,317,587

Receipts and shipments for the week ending Sept. 30 have been:

	1877.	1876.	Increase.	P. c.
Lake ports' receipts	7,338,814	6,217,476	1,121,338	18.0
" " shipments	5,096,778	4,225,204	871,574	20.6
Atlantic ports' receipts	5,792,479	3,192,147	2,600,332	81.5

The Northwestern (lake ports') receipts for this week are, we believe, the largest on record, exceeding even any in 1873. Of the total receipts for the past nine months about three-sevenths have been in the two months since July.

Of the shipments from these ports, 22 per cent. were by rail this year, against 42½ in 1876, 37½ in 1875 and 13½ in 1874.

Of the receipts at Atlantic ports, 55.1 per cent. was at New York, 16.9 at Montreal, 10.3 at Philadelphia, 8.5 at Baltimore, 6.6 at Boston, 2.3 at New Orleans and 0.3 at Portland.

Chicago receipts and shipments for the week ending Oct. 6, were:

	1877.	1876.	Inc. or Dec.	P. c.
Receipts	3,504,463	3,575,535	Dec.. 71,072	2.0
Shipments	3,252,393	2,665,201	Inc...587,192	22.0

There is a great falling off in the receipts of corn at Chicago, not quite made up by the large increase in wheat and oats receipts.

THE SCRAP HEAP.

A Queer Train Load.

The Utica (N. Y.) *Herald* of recent date says: "A two-story house, with a large wing, was moved on a train of four cars from Sandy Hill to Pulaski, Monday. The job occupied two hours, and the building was uninjured."

Railroad Manufactures.

At the St. Louis Exposition last week awards were made to the St. Louis Bolt & Iron Co. for the best display of rolled iron for machinery or railroad use; for the best rail-joint fastener; for steel rail fastenings; for steel tire, and for steel wire rod.

The Cambria Iron Works, at Johnston, Pa., are furnishing the rails for the Pittsburgh, Wheeling & Kentucky road.

The Helmbacher Forge & Rolling Mill Co., at St. Louis, is running its works full time, with plenty of orders.

The Tredegar Works, at Richmond, Va., are said to have more work on hand than at any time for four years past.

The Laclede Rolling Mill, at St. Louis, recently started up again.

The Jackson & Woodin Car Co., at Berwick, Pa., has an order for grain cars for a Western road, which will keep the works busy until Jan. 1.

M. M. Buck & Co., of St. Louis, received awards at the recent fair there for hydraulic jacks, locomotive jack-screws, locomotive head-lights, ratchet drills, machinists' vises and emery wheel machinery.

The Pennsylvania Steel Co., at Baldwin, Pa., has declared its usual semi-annual dividend of 10 per cent.

The Manchester Locomotive Works, at Manchester, N. H., recently shipped three locomotives to the Kansas City, St. Joseph & Council Bluffs road.

H. & H. Elliott, of East St. Louis, were awarded premiums at the recent St. Louis fair for railroad switches, frogs and switch stands.

The Brooks Locomotive Works, at Dunkirk, N. Y., have an order for locomotives for the New York Elevated Railroad.

The Chester (Pa.) Rolling Mill is running double turn and employing about 150 hands.

The Glendon Iron Co., at Easton, Pa., has a number of orders and is preparing to put all its furnaces in blast.

The Philadelphia & Erie shops at Renovo, Pa., are full of work. Besides the usual repair work there are 10 of the Pennsylvania engines damaged in the Pittsburgh fire at the shops to be rebuilt.

The Carbon Iron Co., at Parryville, Pa., has been reorganized by the second-mortgage bondholders, who bought in the property at the recent foreclosure sale.

The Port Henry (N. Y.) Iron Co.'s buildings and hoisting machinery were destroyed on the night of Oct. 2 by a fire, which was caused by the explosion of a lamp in the boiler house.

The shops of the Pittsburgh & McKeesport Car & Locomotive Co., at McKeesport, Pa., were entirely destroyed by fire on the night of Oct. 2, the loss being estimated at $100,000. There were policies of insurance amounting to $40,000 on the property. The fire spread and destroyed a large part of the business section of the town.

The office of the Philadelphia Bridge Works, Messrs. Cofrode & Sayler, has been removed to Rooms 3 and 4, No. 265 South Fourth street, Philadelphia.

In August last the Fairbanks Scale Works at St. Johnsbury, Vt., shipped 50 car-loads of scales; 99 car-loads of materials were received during the month.

The Pittsburgh Locomotive Works recently completed two heavy freight engines for the Indianapolis, Peru & Chicago road.

The Bessemer, Akron and Ogden furnaces, on the new Monday Creek Branch of the Columbus & Hocking Valley road, are nearly completed, and expect to go into blast as soon as the branch is finished, early in November. At the Bessemer Furnace 10,000 tons of ore have been taken out from a vein close to the railroad.

A Conductor on Tramps.

During the conversation had with Conductor W. B. Gardner, Monday, with regard to his treatment of the man who committed suicide in Edgefield, Sunday, he had this to say concerning tramps:

"It is not my disposition to be gruff with anybody, but you have no idea how much we are troubled with tramps. If a conductor is not positive with them they will bulldoze the conductor. Sometimes a squad of three or four will attempt to board the train at night and thus think to force the conductor to permit them to ride. I put off seven tramps between here and Gallatin this morning. A few days ago I had a rock car loaded with coal oil. Three tramps found a strip loose, pulled it off and got down among the barrels of petroleum and rode some distance before I discovered them and hustled them out. They will get on the trucks underneath the cars, jump up between cars and ride on the bumpers, and the only wonder is that more don't get killed than do. A contractor wanted to hire half a dozen men at Bowling Green a few days ago, at $1.25 per day, and approached that number of tramps with that proposition, and what do you suppose was their response? They said: 'We have never worked at home, and we don't propose to work here.' That is the real tramp. He wants to be always going; his destination is everywhere, so long as he can steal a ride on railroads and sponge on honest farmers along the line. I never let these vagabonds ride on my train, and never fail to put them off when they have got on without my observation. I confess that I am peremptory in my demands for them to leave the train, but do not propose to treat any one gruffly or roughly unless the conduct of tramps and my official duty seem to demand it, and when it comes to that there will be no hesitation on my part."—*Nashville American.*

Bridge Contracts.

The County Commissioners of Hamilton County, Ohio, will receive at their office in Cincinnati, until Oct. 27, proposals for the masonry and superstructure of a bridge over the Little Miami River, to be 340 feet long in two spans, with 18 feet roadway. Bids will be received for wooden, combination or iron superstructure, bidders to furnish their own plans.

Also, at the same time and place, for sub-structure and superstructure of a bridge over the Little Miami River at Remington, 280 feet span, with 18 feet roadway. Bids will be received for wooden, combination or iron superstructure, bidders to furnish their own plans and specifications.

New Ocean Steamers.

The London *Engineer* says: "Orders have been given for the construction of several new steamships for the Cunard Line. The first of the series will be a steamship of 5,000 tons for the Atlantic service. This vessel is to be called the Gallia. She will be the largest and most powerful steamship yet built for the Cunard Line."

OLD AND NEW ROADS.

Atchison Bridge.

Late on the night of Oct. 5 the western abutment of the bridge over the Missouri at Atchison, Kan., gave way and slid into the river, carrying with it the retaining wall and some 75 feet of the embankment forming the approach to the bridge. A gradual sliding of the abutment had been observed two days before and measures taken to secure it, which failed to accomplish the object. A new abutment is to be built at once. There was no fixed span resting on the abutment, the draw span being on that end of the bridge. Seeing that the abutment was in danger, the Superintendent had the draw swung open a short time before the abutment fell, and it escaped damage.

Atlantic & Great Western.

Judge Daniels, of the New York Supreme Court, has denied a motion made to confirm a certain agreement for the extension of the first-mortgage bonds for three years. The application was opposed by the Franco-Egyptian Bank and some other bondholders, and the Judge decided against the confirmation of the agreement, on the grounds that it provided for payment of the interest on the extended bonds in gold, instead of currency as heretofore, thereby diminishing the surplus left for other bondholders, and also that only one out of three trustees under the second mortgage had joined in the application. The agreement has been approved by the Ohio Court.

Billerica & Bedford.

The cost of this new road has somewhat exceeded the estimate, being about $60,000, instead of about $50,000 for the eight miles. To meet this and the deficiencies in the stock subscriptions the stockholders have voted to authorize an issue of $20,000 mortgage bonds, to bear not more than 6 per cent. interest. It is believed that this issue of bonds will be sufficient to provide for all the unpaid bills and land damages.

Brunswick & Albany.

It is reported that this road has been sold by the present owners to an English company, which will put it in good order and build the extension from Albany, Ga., to Eufaula, Ala., which was partly graded some years ago.

Burlington, Cedar Rapids & Northern.

The Pacific Division is now completed and in operation to Holland, in Grundy County, Ia., three miles beyond Grundy Centre, the last point reported, and 48 miles north by west from the junction with the main line at Vinton.

Chapel Hill.

It is proposed to build a railroad from Chapel Hill, N. C., the seat of the State University, either to Durham on the North Carolina road, about 12 miles, or to Lashley, on the Raleigh & Augusta Air Line, about 18 miles.

Cheraw & Chester.

Track laying has been begun on this road and the rails are

reported down for five miles from Chester, S. C., eastward, with work progressing steadily. A large part of the road is graded.

Chicago, Dubuque & Minnesota.

A Dubuque (Ia.) dispatch reports that a contract for grading an extension of the Elkport Branch (formerly known as the Turkey Valley road) for 20 miles from Elkport, Ia., westward, has been let to Judge Garber, of Elkport.

Chicago & Eastern Illinois

A suit has been begun in the United States Circuit Court in Chicago to enforce a contract made by the old company, the Chicago, Danville & Vincennes, under which the Western Union Telegraph Company had the exclusive use of the telegraph line connected with this road. The new company has disregarded this contract and taken possession of the wires for its own use.

Chicago & Southern.

Chicago papers mention a report that parties representing the Grank Trunk and the Chicago & Lake Huron have been negotiating for the purchase of this road, the object being to secure an entrance into Chicago. The Chicago & Southern is about 20 miles long, and was built to give the Chicago, Danville & Vincennes a line into Chicago; it is in the hands of a receiver, and is not now operated. It is said that the Grand Trunk intends to build a new track for the Chicago & Lake Huron from Valparaiso to Chicago.

Cincinnati, Rockport & Southwestern.

It is understood that the proposition recently made by the bondholders, to reduce the interest on the bonds from 10 to 7 per cent., will not be accepted. To comply with the conditions of the offer would require the stockholders to raise about $135,000, about $15,000 to pay the floating debt and $120,000 to extend the road, and it is not thought possible to raise that amount.

Cleveland, Columbus, Cincinnati & Indianapolis.

This company has been giving the employes on its road several free excursions, those on each section of the road being taken in turn to some point of popular resort on the line. These excursions have passed off very pleasantly and have been much enjoyed by the men and their families.

Colorado Central.

The stations on the Georgetown Branch, lately completed to Georgetown, Col., are as follows, with the distances from the junction with the Black Hawk line at Forks Creek: Floyd Hill, 4 miles; Idaho Springs, 9; Mill City, 15; Lawson's, 20; Empire, 21; Georgetown, 25. This is four miles more than was previously stated.

On the extension of the standard gauge line construction trains are now running to Fort Collins, Col., which is 35 miles southward from the junction with the Union Pacific at Hazard, Wyoming, and 21 miles beyond the point last noted.

Columbia & Port Deposit.

This road, as has been heretofore noted, is now regularly operated as a branch of the Pennsylvania, and is attached to the Philadelphia Division. The stations on it, with the distances from Columbia, Pa., are: Washington, 3 miles; Safe Harbor, 10; McCall's Ferry, 18; Peach Bottom, 26; Conowingo, 32; Octoraro, 35; Port Deposit, Md., 39.3.

Conductors' Brotherhood.

The annual convention, the beginning of which was noted last week, continued in session until Oct. 7, when a final adjournment was had. Most of the members remained to take part in an excursion to which they were invited by the Northern Central and Erie roads. The proceedings of the convention were private, but the following resolutions, which were unanimously passed, have been published:

"*Whereas*, The order of the Conductors' Brotherhood is judged by the conduct of its individual members; and whereas we believe that our aims and objects are misconstrued by outside parties through the negligence of individual members of our Order to support and advocate the two essential principles of the Conductors' Brotherhood, viz., temperance and total opposition to unlawful and violent uprisings of employes, generally termed strikes; be it

"*Resolved*, That we, the members who constitute this grand body, do order the following:

"*Resolved*, That it shall be the duty of all members of the Order to advocate the essential principles of our Order, and it shall be deemed a breach of the obligation for any brother to refuse or neglect to perform the above mentioned duties.

"*Resolved*, That in case any brother shall engage in a strike of railway employes he shall be expelled and the Secretary of his division shall notify the superintendents within his reach of the fact of his expulsion and the cause."

Cumberland & Ohio.

A dispatch from Lebanon, Tenn., states that the Nashville, Chattanooga & St. Louis Company has made a proposition to this company substantially as follows: The Nashville, Chattanooga & St. Louis Company will guarantee the bonds of the Cumberland & Ohio Company to the amount of $10,000 per mile on the line from the crossing of the Tennessee & Pacific near Nashville to Shelbyville, Ky., provided the Cumberland & Ohio will secure the sale of $500,000 of the bonds at not less than 75. The proceeds of the bonds to be applied to the completion and equipment of the road, and the road, as fast as completed to be leased to the Nashville, Chattanooga & St. Louis, the lessee to pay for five years the interest on the bonds and one-half of 1 per cent. as a sinking fund; after five years, one-half of the net earnings as rental. All contracts, sales of bonds, etc., to be approved by the lessee, and work on the road to be under supervision of the lessee's engineer.

The directors of the Cumberland & Ohio have approved this proposition, and will call a meeting of the stockholders to consider it. A large part of the road is graded and ready for the rails, having been built several years ago.

Decatur, Sullivan & Mattoon.

The Court having decided that the owners of this road are entitled to the use of the Illinois Midland track from Hervey City, Ill., to Decatur, nine miles, trains on the road have begun to run through to Decatur. They have always heretofore stopped at Hervey City.

Erie.

The suit brought by the Receiver some time ago against Henry Bowman, formerly Purchasing Agent, and Sigmund Dringer, an iron dealer of Paterson, has been decided by the Court of Chancery of New Jersey in favor of the defendants. The suit was based upon an alleged conspiracy between the defendants and others to defraud the company in the sale of old iron and other scrap, it being claimed that Dringer was allowed to take wrought iron for cast scrap, was allowed false weights, and in other ways permitted to secure advantages, in return for which he had made valuable presents to Col. Bowman and other officers of the road. The suit was remarkable for the great number of witnesses examined and the enormous bulk of evidence taken. The Chancellor decides that the charges of fraud are not supported by the evidence, and dismisses the bill of the complainants, with costs.

Evansville, Owensboro & Nashville.

This road will hereafter be known as the Owensboro & Nashville. This is the second time the name has been changed; it was originally the Owensboro & Russellville. The new name and organization are made by the purchasers at the bankrupt sale in May last. The road is in operation from Owensboro, Ky., to Owensboro Junction, 35 miles.

Fond du Lac, Amboy & Peoria.

Track on this road is now laid to Warrior Ridge, Wis., 23 miles southward from Fond du Lac, and trains are running to that point. The company is at work on another section of 30 miles, and hopes to complete it this year.

Foreclosure Sales.

The following sales of railroad property under legal process are noted:

Worcester & Somerset, at Princess Anne, Md., Oct. 2, under a decree of the Maryland Circuit Court. Bought for $4,600 by George A. Rahun. The road is nine miles long, from Newtown, Md., to Newtown Junction on the Eastern Shore road.

Future sales are noted as follows:

The *Ashburnham Railroad* will be sold under foreclosure in January, the mortgagees having secured a decree in enforcement of their lien. The road is three miles long, from South Ashburnham, Mass., to Ashburnham; it was built in 1873, and has a bonded debt of $12,000.

The property and franchises of the *South Mountain Railroad Company* will be sold at Sheriff's sale at Lebanon, Pa., Oct. 23. No part of the road is finished, but a good deal of grading has been done between Harrisburg and Hamburg, Pa.

Hamilton & Northwestern.

The Northwestern Division is now completed and opened for business from Hamilton, Ont., northward to Clarksville in Simcoe County, about 60 miles.

The Grand Trunk Company has concluded an agreement with this company for the exchange of business to and from Hamilton, and will hereafter carry through passengers and freight both to and from Hamilton.

Hannibal & St. Joseph.

The situation on this road at Quincy, Ill., remains unchanged. The engine and seven coaches attached at the suit of Gen. Singleton are still in the hands of the marshal. The through passenger business over the Wabash road is taken direct to Hannibal; the passenger business between Quincy and Palmyra Junction is done with a train borrowed from the Chicago, Burlington & Quincy, while freight trains run only to West Quincy, on the Missouri side of the river, where the trains are broken up and the cars brought over to Quincy by the switching engines.

Hardwick & Marshfield.

It is proposed to build a railroad from Marshfield, Vt., on the Montpelier & Wells River road, northward to Hardwick on the Portland and Ogdensburg, about 15 miles. The route is covered by a charter granted four years ago, and it is thought that the road can be cheaply built.

Harlem Extension.

The Springfield *Republican* says: "There is great interest in Vermont over the suit of Trenor W. Park, of North Bennington, against the towns which bonded themselves to build a part of the road which was afterward consolidated into the Harlem Extension. The case is to be heard before the full bench of the Supreme Court at Montpelier this month. * * * Of the old Harlem Extension road, formed by the consolidation of the Western Vermont road, running from Rutland to Bennington, and the Lebanon Springs road, extending from Bennington to Chatham, N. Y., the latter section is not operated. The former, controlled by President Gardner and a Vanderbilt board of directors, is really operated by Mr. Park, and he is to be allowed to redeem it whenever he can raise the means, at something of a sacrifice of Mr. Vanderbilt's original loan of $500,000, under which the road has been foreclosed, as Mr. William H. Vanderbilt does not fancy Vermont railroading. Should Mr. Park, therefore, win his suit against the bonded towns, their indebtedness would just about cancel the Vanderbilt judgment against him and put Park in full control of the Harlem Extension road, as he has long ago become directly and indirectly possessed of whatever interest or control the towns had in the road."

Houston & Texas Central.

The Union Trust Company, Trustee in possession of the Missouri, Kansas & Texas Railway, has begun suit to attach the funds from which the coupons of the Houston & Texas Central Company are being paid in New York, in order to secure the payment of traffic balances due. Messrs. John J. Cisco & Son, the agents of the Texas Central, having denied that they were custodians of the money, supplemental proceedings have been begun to find out where it is.

Illinois Central.

The Land Department reports for September sales of 928.44 acres for $6,299.08. Cash collected on land contracts was $11,875.28.

The Traffic Department reports earnings on the 707 miles of road in Illinois as follows: 1877, $563,015.00; 1876, $488,594.33; increase, $74,420.67, or 15.2 per cent. The company's circular says:

"Owing to the large wheat harvest and early shipments, there is also a gain on the *line in Iowa* in the traffic of September, as compared with same month last year, of $63,541.42."

Indianapolis, Cincinnati & Lafayette.

Receiver Ingalls reports to the Court for August receipts from all sources amounting to $179,551.33. The disbursements were $153,583.63, leaving a balance of $25,967.70. Of the receipts $66,468.88 were on passenger account, and $71,082.49 on freight account.

Indianapolis, Delphi & Chicago.

An Indianapolis dispatch says that this company has concluded a contract with G. Yeomans and associates to build this narrow-gauge line from Rensselaer, Ind., southeast to Indianapolis, about 120 miles. The section from Rensselaer to Bradford, 16 miles, is to be built at once, but the construction of the rest of the line depends upon the ability of the company to raise a specified amount per mile of road.

Louisville, Cincinnati & Lexington.

Receiver McLeod's report to the Court for August is as follows:

Balance Aug. 1	$182,181 15
Receipts for the month	147,238 06
Total	$329,419 21
Disbursements	114,603 36
Balance, Sept. 1	$214,815 85

The receipts exceeded the disbursements by $32,634.70 for the month.

Louisville & Nashville.

At the annual meeting in Louisville, Oct. 3, resolutions were adopted ratifying and approving the action of the directors in buying the Louisville Extension of the Louisville, Paducah & Southwestern road; also approving the settlements made with the South & North Alabama Company and the State of Alabama.

Lake Shore & Michigan Southern.

An increase of pay, equivalent to one-half of the 10 per cent. reduction made last July, has been ordered. The order applies to all salaries less than $2,000 per year, and will take effect Nov. 1.

Lehigh & Lackawanna.

At a meeting held in Philadelphia, Oct. 8, the stockholders voted to extend this road from its present terminus at Champman, Pa., northward 10 miles to the Wind Gap. It will connect there with the road now being built from Stroudsburg. The extension was partly graded several years ago.

Lafayette, Muncie & Bloomington.

Receiver Chapman reports to the Court for July as follows:

	Eastern Div.	Western Div.	Total.
Gross receipts	$10,614 24	$6,796 46	$17,410 70
Expenditures	7,070 63	3,455 52	10,526 15
Net receipts	$3,543 61	$3,340 94	$6,884 55

The report is of actual cash receipts and disbursements.

Lowell & Lawrence.

At a special meeting in Boston, Oct. 5, the stockholders voted to ratify a contract for the renewal of the present lease to the Boston & Lowell Company. The new lease will run 25 years, the rental to be 5 per cent. on the stock, 6 per cent. interest on the bonds, and a further payment of 1 per cent. on the bonds as a sinking fund.

Meetings of Railroad Managers.

The adjourned meeting of railroad managers was held in New York, Oct. 4, continuing for three days. All the trunk lines and their principal connections were represented and the several meetings were generally harmonious. The chief business effected was the adoption of an agreement for the maintenance of through rates on east-bound freight, and the appointment of a committee of supervision, to see that the agreement is carried out.

No final decision was had as to a change of the New York apportionment of west-bound freight, concerning which it is said another meeting will be held Monday.

Missouri Pacific.

The *Commercial and Financial Chronicle* of Oct. 6 says: "Default was made in the October interest of the first-mortgage bonds of the Pacific Railroad of Missouri, Carondelet Branch."

The Carondelet Branch bonds outstanding amount to $500,000, and are a prior lien on the 15.5 miles of that branch.

Montclair & Greenwood Lake.

Receiver Hobart, having received the necessary order from the Chancellor, took formal possession of the road Oct. 6. An application was made to have Mr. Grinnell Burt, General Manager of the road, appointed co-Receiver, but the Chancellor declined to grant it.

Track was laid several weeks ago from the old terminus at Cooper, N. J., on Greenwood Lake, north by east up the east side of the lake to the State Line, about three miles. Some work has been done beyond the State line, but it is not likely that any further progress will be made for a time.

Napa City & Monticello.

It is proposed to build a narrow-gauge railroad from Napa City, Cal., to Monticello, about 35 miles. The preliminary surveys have been made and the cost is estimated at $250,000.

New Brunswick.

At a meeting held in St. John, N. B., Oct. 2, it was decided not to stop work at the Great Falls, but to continue to push the work on the line to Little Falls and Edmunston. The road is now nearly completed to the Great Falls of the St. John, and will soon be ready to open for traffic to that point.

New York Central & Hudson River.

An order from President Vanderbilt directs that from Nov. 1 one-half of the 10 per cent. reduction made in July last be restored, the order applying only to salaries less than $2,000 per year.

New York & New England.

The Boston *Journal* says: "It is understood that the New York & New England Railroad made a proposition to the legislative committee to consider what disposition should be made of the State property in that road to the effect that the State should loan $6,000,000, the company giving as security $9,000,000 of the $10,000,000 bottom mortgage bonds, and also agree to pay 5 per cent. interest on the $6,000,000 to be loaned, and 5 per cent. interest on $3,600,000—the amount originally loaned to the company by the State. For this latter amount the State took Berdell bonds. These bonds have since been converted into stock, and the pledge to pay the interest on this amount—which, of course, the company is not bound to pay until the full interest on the bonds is paid—was the inducement held out to the committee to recommend the loan. The interest on these two sums at 5 per cent. would amount to $480,000 per year. The railroad commissioners, in their report upon this subject last winter, stated that the net income of the road was about $100,000 yearly. This income, it was supposed, would be increased when the company should purchase the Hartford, Providence & Fishkill road, which they proposed to do with a part of this loan; and they proposed, also, to finish the road to the Hudson River. It seems, however, that the committee distrusted the capacity of the road to earn money enough to pay the interest. At any rate, whatever their reasons were, they have notified the company that they cannot recommend the proposed loan."

Northern Pacific.

The general offices of the road are to be removed from Brainerd, Minn., to St. Paul.

The track on the Puyallup Branch of the Pacific Division is now laid to the Puyallup coal mines, 31 miles from New Tacoma, Wash. Ter. This branch is expected to have a large coal traffic, chiefly from mines owned by the company.

Ohio & Mississippi.

In the United States Circuit Court at Indianapolis, Oct. 1, a supplemental bill was filed by the National Trust Company, of New York, asking to be made a party to the foreclosure suit in its capacity as Trustee under the mortgage on the Springfield Division, formerly the Springfield & Illinois Southeastern Railroad.

On petition of the Receiver the United States Circuit Court has granted a temporary injunction restraining the National Trust Company of New York from selling four hundred $1,000 bonds of the Springfield & Illinois Southeastern road, and requiring the managers to show cause why they shall not be punished for contempt. Judge Gresham set the hearing down for the first Monday in November.

Receiver King reports to the Court for September as follows:

Balance, Sept. 1	$101,853 85
Receipts for the month	429,777 23
Total	$531,631 08
Disbursements on all accounts	516,161 77
Balance, Oct. 1	$15,469 31

The disbursements were $86,384.54 in excess of the receipts for the month.

Panama.

The necessary surveys and estimates are now being made for an extension of this road from the terminus on the wharf at

Panama to the island of Flamenco in the bay. The distance is about three miles, all over water, and the extension will probably be built on iron screw piles. The island of Flamenco is in deep water and the largest vessels can come up to a wharf there; at present vessels have to be unloaded by lighters, not being able to come up to the railroad wharf.

Pennsylvania Petroleum.

The Pennsylvania Circuit Court has granted an application for the appointment of a receiver for the property of this company. The road is partly graded from Erie, Pa., to Cambridge, but no part of it, or only two or three miles, was ever completed.

Philadelphia & Reading.

Of the six men tried on charge of setting fire to the bridge over the Schuylkill at Reading during the strike, two pleaded guilty and will be used as witnesses by the State; one was acquitted by the jury, and in the other cases a *nolle prosequi* was entered, the State witnesses not being able to identify them fully. A large number of indictments for rioting, destroying property, etc., have been found, and are now being tried at Reading.

Pittsburgh & Lake Erie.

Mr. B. J. McGrann, general contractor for this road, will receive at Rochester, Beaver County, Pa., until Oct. 16, proposals for the grading and masonry of the 70 miles of standard-gauge road from Pittsburgh to Youngstown, O. The work will be divided into sections of about one mile each, and bids will be received for one or more sections. Profiles and specifications can be seen, and blank forms for bids obtained at the office of Francis H. Taylor, Engineer, at Rochester Pa.

The route of this road is thus described by Chief Engineer Wimmer: "The road will start from Jones & Laughlin's mill in Birmingham, opposite Pittsburgh, and will run along the south side of the Ohio River to Phillipsburg, opposite Rochester, Pa., 26 miles from Pittsburgh, where it will cross the Ohio on an iron bridge 90 feet above low water. This bridge will have one span of 180 feet, then one of 445 feet, then one of 260 feet, then two of 229 feet and then about 1,000 feet of iron trestle, making 1,343 feet truss bridge and 1,000 feet of trestle. From Phillipsburg it will run up Beaver Creek (passing under the Pittsburgh, Fort Wayne & Chicago at Beaver Falls) to Mahoning town, where it will cross the Erie & Pittsburgh, and then follow Mahoning Creek, on the north side, to Hazleton, near Youngstown, O., a distance of 68 miles from Pittsburgh. * * The road is to be laid throughout with steel rails, 60 lbs. to the yard, and all bridges are to be of iron."

Providence & Stonington Steamship Company.

This company, which is controlled and chiefly owned in the interest of the New York, Providence & Boston Railroad Company, suffered a serious loss last week, its fine steamboat Massachusetts, used on the line between New York and Providence, having gone ashore on Rocky Point, Long Island, during the great storm of Oct. 4. The boat was very badly damaged and will, it is feared, prove a total loss. The boat was new, having been finished only last spring, was 325 feet long, with a beam engine 7½ feet diameter of cylinder and 14 feet stroke. The boat was very handsomely fitted up and cost $435,000, but was insured for only $75,000. She had a cargo valued at $200,000 on board, a large part of which was saved, as were all the passengers and crew.

Rhode Island & Massachusetts.

This road, lately completed from Franklin, Mass., south to Valley Falls, R. I., is now operated by the New York & New England Company, and is known as the Providence Division of that road. The trains over it are run through to Providence, using the six miles of the Providence & Worcester track from Valley Falls to Providence, and making a line between Boston and Providence 47 miles long.

Rock Island & Mercer County.

Trains on this road now run to Cable, Ill., 22 miles southward from the junction with the Peoria & Rock Island at Milan, and 26 miles from Rock Island. This is nine miles more track than we have heretofore had notice on this road; it has probably been laid some time.

Scioto Valley.

On the extension of this road from Chillicothe, O., to Portsmouth, the tracklayers working from Portsmouth northward have reached Waverly, 30 miles from the starting point. The station buildings have been commenced and work is actively progressing.

Southern Pacific.

The Government officers have stopped this company from using the recently completed bridge over the Colorado River at Fort Yuma and the track on the Arizona side of the river. That end of the bridge is on the Government military reservation, and it is held that the company has no legal right to lay its track there. The stoppage is understood to have been ordered at the instance of the Texas & Pacific Company, which filed a remonstrance against a previous order permitting the construction of the bridge. The whole matter is to be referred to Congress, no officer of the Government having power to grant right of way over the reservation unless specially authorized by law.

Southern Railway & Steamship Association.

The annual meeting was held in Atlanta, Ga., Oct. 3, with a very full attendance of members. The first day was chiefly occupied by the reading of the report of Mr. Virgil Powers, General Commissioner, for the year ending Aug. 31. Several recommendations made in the report were referred to a special committee for consideration.

On the following day the Committee on Revision of Rates presented a report, which was adopted after some discussion. Arrangements were completed for the division of receipts for past unsettled business, and, after some informal discussion, the convention adjourned.

South Pacific Coast.

On the extension of this road from Newark, Cal., north to Alameda, track is now laid to San Lorenzo, 13 miles from Newark. The grading beyond that point is well advanced, and the expectation is that trains will run to Alameda by the end of the year.

St. Louis & Southeastern.

The report of Mr. E. Young, Auditor, for August, is as follows:

	St. Louis Div.	Kentucky Div.	Tennessee Div.	Whole Line.
Gross earnings.....	$60,121 13	$33,436 99	$17,139 81	$110,697 93
Expenses.....	43,412 99	24,873 61	11,622 67	79,909 27
Net earnings.	$16,708 14	$8,563 38	$5,517 14	$30,788 66
Per cent. of exp'n's.	72.35	74.47	67.97	72.19

As compared with August, 1876, the whole line shows an increase of $8,731.67, or 8.6 per cent., in gross earnings, and of $14,366.11, or 87.6 per cent., in net earnings.

St. Louis, Iron Mountain & Southern.

This company now offers to pay 50 per cent. on the coupons due June 1, 1877, on the Arkansas Branch and Cairo, Arkansas & Texas bonds.

The new foreclosure suit begun by the Union Trust Company came up in the United States Circuit Court at St. Louis, Oct. 5, for argument on a demurrer filed by the company. After hearing argument the Court decided as follows:

"We are of opinion that the demurrer of defendant to the bill based upon the defect of parties defendant is not well taken. It may be in some subsequent step of the case that the Marquands and Allen may be entitled to intervene for the protection of their interests in such form and manner as shall then seem necessary and proper. It is only necessary now to decide that the bill of complaint does not state a case which entitles the mortgagor to insist that those persons shall be made parties, as they are not necessary parties to the relief sought. Demurrer overruled."

St. Paul & Minneapolis Air Line.

Mr. W. H. Hewitt, of Milwaukee, Wis., has offered to build and operate this proposed line, provided he is given a bonus of $15,000. The line is to be a light road, operated by steam cars, and intended for passenger traffic chiefly.

Toledo, Peoria & Warsaw.

Receiver Hopkins reports to the Court for August and September as follows:

Balance, Aug. 1		$1,091 49
Receipts for August		143,134 56
Receipts for September		159,631 82
Total		$303,857 87
Disbursements in August	$137,566 63	
Disbursements in September	142,989 70	
		280,556 33
Balance, Oct. 1		$23,301 54

The receipts exceeded the disbursements by $5,567.93 for August, by $16,642.12 for September, and by $22,210.05 for the two months.

The Great Storm.

A very heavy rain-storm, which prevailed all over the Eastern and Middle States and extended some distance south along the Atlantic coast, did widespread and in some cases very serious damages to railroads on the afternoon and evening of Oct. 4. The storm was remarkable for the great quantity of rain which fell in a short time, and many wash-outs are reported, some of them causing serious accidents. A great deal of damage was done, hardly any of the roads exposed to the storm escaping some injury.

Toledo, Ann Arbor & Northern.

Mr. James M. Ashley, of Toledo, O., who owns this unfinished road, has been trying for some time to raise subscriptions along the line for the purpose of completing it as a narrow-gauge road. The required amount ($50,000) having been secured, work was begun at Dundee, Mich., this week. It is said that Mr. Ashley has secured assistance from some Boston parties.

United New Jersey.

Reports have been current for some time that a movement was on foot among the stockholders of this company to contest the legality of the lease of its property to the Pennsylvania Railroad Company. Last week it was further reported that steps had been taken to enjoin the payment of the October dividend, and that the officers of the Pennsylvania were secretly favoring the movement. On the strength of these reports the stock was forced down from 126 to 116, and some excitement was caused, which led to a published statement from President Scott to the effect that the Pennsylvania Railroad Company had not in any way favored the reported movement to break the lease, and had instructed its counsel to oppose any proceedings that might be taken. No injunction has been procured and the October dividend is being paid as usual.

Waterloo & Magog.

This road is now completed and was to be opened for business this week. It has been under construction for several years and is 19 miles long, extending the Stanstead, Shefford & Chambly road from Waterloo, P. Q., east by south to Magog, at the foot of Lake Memphremagog.

Western, of Minnesota.

This company, which is completing the line formerly known as the Brainerd Branch of the St. Paul & Pacific, is pushing work so actively that it is expected that trains will run through from Sauk Rapids to Brainerd before the end of the month. The contract for building the depots, water stations and section houses has been let to Wm. Hill, of Minneapolis, who has already begun work.

Zanesville & Hocking Valley.

It is proposed to build a narrow-gauge road from Zanesville, O., southwest to Straitsville, about 30 miles, the object being to open a new connection with the Hocking Valley coal and iron region.

LOCOMOTIVE RETURNS, MAY, 1877.

Master Mechanics of all American railroads are invited to send us their monthly reports for this table.

Name of Road.	Number of miles operated	Number of Locomotives in service	Mileage Total	Mileage Average per Engine	No. Miles run to Ton of Coal	No. Miles run to Cord of Wood	No. Miles run to Pint of Oil	Average No. of freight cars hauled	Average cost pr. freight car per mile, cents.	Cost per Mile in Cents for Repairs	Fuel	Stores	Miscellaneous	Engineers, firemen, and wipers	Total	Av. c'st of Coal, per ton of bushel	Av. c'st of Wood per cord
																$	$
Allegheny Valley (River Division)*	139	...	93,106	.....	38 59	....	21.12	21 30	0.960	8.83	3.48	0.61	...	7 07	19 97	.	.....
" " (Lake Grade Div.)*	120	....	44,959	.....	27 02	....	22 26	21.40	0.978	5.64	4 56	0.63	....	6.94	17 77	.	.....
Atlantic & Great West'n (1st & 2d Divs.)†	228	83	220,646	2 658	44.87	....	18.10	....	....	4.72	4 75	0 48	0.64	6.18	16.75	1 88	2 87
" " (Third & Fourth Div's. †	197	48	108 045	2,251	41.87	....	20.83	....	....	4 04	4.75	0 39	0 83	5.86	15.87	1 88	2.87
" " (Mahoning Division)†	88	55	129,835	2,361	41 87	....	20 12	....	.....	2 88	4.75	0.41	0.45	5.87	14.36	1 88	2.87
Atlantic & Gulf	343	20	46,614	2,330	..	59 47	8.75	....	....	8 40	4.15	0.44	....	8 55	21.60	.....	2.46
Cairo & Vincennes	157	11	23,079	2,098	46 40	....	15 60	....	....	5.63	3.31	0 36	....	5 55	4 85	1 50	....
California Pacific	152	11	30,366	2,761	45 42	50.03	21.77	8 80	.....	7.75	18.02	0.56	0.32	7.76	34 41	8 12	5 25
Camden & Atlantic	67	12	19 443	1,620	60 50	....	12 85	....	....	4.58	6.66	0.87	.....	4 98	17.09	4.12	....
Central Pacific (Western Division)‡	201	52	137,106	2,637	40 26	....	20.16	.....	....	8 10	8.03	0 54	0 52	7 91	3 10	4 90	7.25
" " (Visalia Division)‡	157	18	35.874	2,760	56.61	....	17 35	....	.....	3.47	12.82	0.60	0 27	6.48	23 64	4.90	7 5
" " (Tulare Division)‡	171	12	25,503	2 319	37.34	....	11 50	....	....	5.21	19.43	0.89	0.31	8 27	34.11	4 90	7.25
" " (Los Angeles, Yuma, San Diego and Wilm. Divs.)‡	304	20	57,480	2 874	40.74	..	14.88	....	....	3.31	17 81	0 67	0.17	7 55	29.51	4.90	7.25
" " (Sacramento Division)‡	120	39	93,500	2 397	.....	28.73	16 94	.....	.....	11 49	17.05	0 63	0.32	8 70	38.19	...	7.25
" " (Oregon Division)‡	152	6	18.158	3,026	....	40.17	22.09	.....	.....	3 81	12.19	0.50	0 27	8 90	25 67	.....	7.25
" " (Truckee Division)‡	205	28	64,104	2 289	29.63	27.68	17.52	.....	.....	4.87	21 34	0 73	0.47	8 93	36 36	4 90	7.25
" " (Humboldt Division)‡	201	19	47,444	2 496	35 32	....	18.45	....	.....	5.21	20.54	0 67	0 4	7.75	34 48	4.90	7 25
" " (Salt Lake Division)‡	219	28	77,768	2 778	30.22	....	17 27	....	.....	4.35	24.00	0.64	0.42	7.25	36.66	4 90	7.25
Cleve., Col., Cin. & Ind. (Col'bus Div.)	138	59	174 415	2,956	46 64	50.00	30.31	....	....	2 26	4.27	0.46	0.60	5 78	13.32	1.75	3.50
" " " (Indianapolis Div.)	203	64	186.305	2,911	44 46	38.38	22 48	.....	.....	3.41	4.70	0.62	1.27	5 59	15 59	1 75	3.50
" " " (Cincinnati Div.)	130	35	78 637	2,383	41.97	....	22.34	....	....	4 39	4.50	0.52	0.89	5.85	16 25	1.75	3 50
Cleveland & Mahoning Valley	41	6	15 146	2 524	48.70	....	20.69	....	....	1.63	3 84	0.35	1.13	6.16	13 11	1.72	2 77
Cleveland & Pittsburgh*	199	77	170 545	2,215	50 68	..	19.72	17.20	0 840	3.37	2.79	0.53	1.95	8 85	15.49	1 24	3.76
Del., Lacka. & West. (Bloomsburg Div.)§	80	22	56,270	2 558	.....	....	34.19	....	....	3.9	.....	0.61	....	5 28	9.86	.....	.....
Erie & Pittsburgh*	98	28	56,649	2,023	42.69	....	17.94	18.20	0.762	4.23	4.35	0.64	1.83	7.01	18.06	1.86	1.85
Hannibal & St. Joseph	296	....	.....	.....	.....	....	.....	....	....	.....	.....	.....	.....	.....	.....	.....	.....
Illinois Central (Chicago Div.)‖	253	50	131,190	2,624	40 97	....	17.94	19.77	....	4.71	5.00	0.27	.....	5.89	15 90	1.90	4 50
" " (South Div.)‖	231	26	67.388	2,592	43 58	....	15.74	14.74	....	6 60	4 68	0.31	.....	5.82	17.41	1 90	4 60
" " (North Div.)‖	225	33	75 893	2,300	36.34	....	14.91	15.34	....	5.68	5.50	0.31	.....	6.00	17 49	1.90	4.50
" " (Iowa Div.)‖	401	36	86 577	2 349	38.82	....	18 95	10.67	....	4 84	7 35	0.27	.....	5 99	18 45	2.75	4 70
Jeffersonville, Madison & Indianapolis	226	41	85,417	2,108	48.39	25.53	16.21	19.27	1.040	4.84	5.41	0.45	1 75	6 31	18.76	2 50	2.20
Kansas Pacific and controlled lines¶	914	74	159,237	2 152	29.48	....	13.35	.	....	5 01	11.40	0.42	.....	6.88	23 71	3.30	4 22
Kansas City, St. Jo. & Council Bluffs**	275	28	82 480	2 946	59.90	....	26.40	14 70	.....	4 30	5.10	0.40	.....	6 70	16.50	2.90	3.50
Lake Shore & Mich. So. (Buff. Div.)††	.....	90	171 028	1,900	40.56	44.87	.....	.....	.....	5.33	7.85	0.58	.....	6 40	19 96	3 05	5 69
" " (Erie Div.)††	.....	113	244.260	2,161	42.35	....	.....	.....	.....	4.93	6.66	0 32	.....	5.70	17.64	2 67	5 43
" " (Toledo Div.)††	.....	85	138,813	1.6 3	34.75	57 65	.....	.....	.....	4.69	8 86	0 42	.....	5 90	19 89	3.12	4.08
" " (Mich. So. Div.)††	.....	207	379.329	1 832	40 57	63.34	.....	.....	.....	5.83	8 51	0 29	.....	6 34	20 86	3.55	4.63
Louisville & Nashville (First Div. ††	332	....	100 712	.....	29.00	34 31	12.10	....	....	4.76	8.30	0.46	1 54	7.30	22.36	0 093	2 81
" " (second Div.) ††	200	....	64,414	.....	31.00	....	11.54	.	....	3.69	7 60	0.51	2.10	6.15	2 .05	0 091	3.00
" " (Memphis Div.)††	131	....	34,756	.....	31.50	....	11 90	.....	.....	2.78	10.97	0.61	2 17	5 96	22.49	0.136	3 50
" " Nashville & Decatur Div.)††	122	....	38,906	.....	38.50	....	14.11	.....	.....	4.18	7.30	0.58	1.60	6 22	19.88	0.108	3.70
" " (S. & N. Alabama Div.)††	183	....	60 831	.....	35 00	41 54	12 28	....	....	4 32	6.70	0.73	1.37	5.73	18 85	0.09	2 25
Missouri, Kansas & Texas‡	786	70	200 145	2 959	33 97	....	11.89	14.40	1 220	3.33	6.60	0.56	.....	5.69	16 8	2 26	.....
North'n Cent'l (Elm. & Canand'gua Div.)	147	46	99 147	2,155	30.44	....	20.83	.....	.....	5.56	5.20	0.66	....	6.25	17.67	0.06	2.24
Pennsylvania (New York Division §§	120	121	268 995	2,223	34 47	....	11.26	.....	.....	7.20	9 00	1.10	.....	.....	17.30	0.12	5.36
" (Amboy Division)§§	154	45	80,645	1,792	55.42	....	20.58	....	.....	6.40	5.50	0 60	....	....	12.50	0.12	5.39
" (Belvidere Division §§	103	40	71,286	1.782	34.93	....	15.53	.	.....	5.80	8.80	0 80	..	.....	15.40	0.12	5.36
" (Philadelphia Division)§§	191	189	419,330	2,219	29 05	....	14.45	.....	.....	7 50	4.40	0 80	.....	.....	12.70	0.048	2.72
" (Middle Division)§§	534	97	271,190	2 796	29 72	....	20.58	.....	.....	6.70	4 20	0.60	.....	.....	11.50	0.048	2.72
" (Pittsb'gh Div., E. End)§§	.....	77	160.414	2,083	21.57	....	12.11	.....	.....	5.60	5.70	0.90	.....	.....	2.20	0.048	2.72
" (Pittsb'h Div., West End)§§	.....	104	244,832	2 354	35 19	....	15.02	.....	.....	7.40	3 50	0.70	.....	.....	1.60	0.048	2.72
" (Tyrone Division) §§	107	30	58 315	1,944	23.26	....	21.93	.....	.....	8 00	5.40	0.60	.....	.....	14.00	0.048	2.13
" (West Pennsylvania Div)§§	104	21	40,231	1 918	43.70	....	38.46	.....	.....	4.60	3 00	0 30	.....	.....	7.90	0.048	2.72
" (Lewistown Division) §§	56	6	9,282	1.664	38.93	....	19.69	.....	.....	2 40	3.20	0.50	.....	.....	6.10	0.048	2 85
" (Bedford Division) §§	57	3	9,524	3,175	28 54	....	29.59	.....	.....	2.10	4.30	0.30	.....	.....	6.70	0.48	2.72
Pitts., Ft. Wayne & Chi. (East'n Div.)*	371	154	341.477	2,217	50.09	....	17.63	14 30	1.107	3.81	3.23	0.67	1.78	6.88	6.37	1 64	1.63
" " (Western Div.)*	280	115	239 807	2,085	44.99	....	20.48	22.70	0 851	4.30	4 31	0 37	1.71	6 79	17.48	1 94	1.93
Pitts., Cin. & St. L. (Little Miami Div.)*	197	39	92,886	2 382	45.01	....	3 87	16.52	0.907	4 05	6 05	0.64	2.19	6.30	19.23	2.63	2 25
" " " (Pitts. Cin. & St. L. Div.)*	224	76	215,143	2,831	30.26	....	15.81	18.90	1.050	8.04	3 99	0.69	2.20	6.49	21.41	1.10	3.00
Pittsburgh, Titusville & Buffalo*	158	....	49,435	.....	41.56	....	19.12	15 30	1.089	4 70	4.48	0.57	...	6.64	16 39	.....	.....
St. Louis, I. M. & So. (Arkansas Div.)	225	32	70,170	2,193	.....	54.40	20.30	.....	.....	2 89	4.31	0 42	...	6 13	13.75	.....	2 35
St. Louis & San Francisco¶	328	....	66,356	.....	37.00	....	15.00	.....	.....	5.23	4.00	0.38	.....	5 64	15.25	2.20	2.15
St. Louis & Southeastern (St. Louis Div.)	210	....	52,520	.....	57.40	....	17.20	.....	.....	4.6	2.40	0.40	.....	6 2	13 60	1.25	.....
" " (Nashville Div.)	145	....	41,711	.....	42 80	....	15.20	.....	.....	4.80	2.60	0.30	.....	6.70	14.40	1.02	....
Stockton & Copperopolis	49	2	3.873	1,937	41.26	79.50	23.33	.....	.....	0.92	6 83	0,54	0.78	9.03	18 10	3 00	4 90
Terre Haute & Indianapolis (Indianapolis Div.)	80	....	72,785	.....	34.10	....	25.70	.....	.....	5.50	5 28	0.69	1.76	6 84	20.07	....	.....
" " " (Vandalia Div.)	158	....	82,068	.....	35 70	....	21.50	.....	.....	5.82	4.07	0 76	1 98	6.36	18.99	.....	.....
West Jersey §§	128	16	37,394	2,337	51.43	....	19.76	.....	.....	7.10	7.50	0.50	....	....	15.10	0 152	5 16

* Five empty cars rated as three loaded ones.
† Fuel averages are for the whole road.
‡ Switching engines allowed 6 miles per hour; helping engines actual distance and 4 miles per hour while waiting trains.
§ Fuel not estimated.
‖ Two empty cars rated as one loaded one.
¶ Switching and work train engines allowed 6 miles per hour.
** Three empty cars rated as two loaded ones.
†† Switching engines allowed 6 miles per hour.
‡‡ Water service and fuel stations (not included above) 0 97 ct. per mile; rental of engines, 0.46 ct. per mile; three empty cars rated as two loaded ones; switching and work train engines allowed 6 miles per hour.
§§ Engineers', firemen's and wipers' wages not included in cost.
The ton of coal is 2,000 lbs., unless otherwise specified; 25 bushels counted to the ton.